Final

Routine and Recurring Small Transient and New Test Missions Environmental Assessment

April 2008

95th Air Base Wing
Environmental Management Directorate
Edwards Air Force Base, California

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14. ABSTRACT
The Air Force Flight Test Center at Edwards Air Force Base, California proposes to add up to 25 aircraft, 2000 sorties per year, and 1500 military, government civilian, and contractor personnel to support small transient and new test missions that would operate at Edwards Air Force Base and in the R-2508 Complex.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR ROUTINE AND RECURRING SMALL TRANSIENT AND NEW SMALL MISSIONS ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

The Air Force Flight Test Center at Edwards AFB, California proposes to add up to 25 aircraft, 2,000 sorties per year, and 1,500 military, government civilian, and contractor personnel to support small transient and new test missions that would operate at Edwards AFB and in the R-2508 Complex.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This Environmental Assessment (EA) evaluates the potential effects of the proposed action and three alternatives that would include major and minor construction that could be needed to support the proposed action or alternatives. Alternative A would include the complete contingent of aircraft, personnel, and major construction activities. Major construction would occur over a 3-year period, with the majority of the construction occurring during the first 2 years of the proposed action. Alternative B would be similar to Alternative A, except only minor construction would occur; Alternative C would use existing facilities, and Alternative D is the No-Action Alternative.

3.0 ENVIRONMENTAL CONSEQUENCES

The components of the human environment analyzed for potential significant impacts include air quality, airspace management and air safety, hazardous waste/solid waste, natural resources, noise, infrastructure, safety and occupational health, and socioeconomics. No significant impacts were identified in any of these areas. Specifically, the components of the environment that would potentially experience the greatest impact are air quality and noise. Air emissions from the proposed action and alternatives would be below *de minimis* values for Kern County pollutants of concern, and noise levels would add to the current noise but would still be below the annoyance threshold for sonic booms. Noise levels would be below the United States Environmental Protection Agency (U.S.EPA) threshold of 55 decibels, day-night average noise levels (dB DNL) for residential and outdoor areas where quiet is a basis for use. Consequently, the proposed action would have no significant impacts on air quality or sound levels.

The proposed action would result in a 20 percent increase over current operations at Edwards AFB and a 5.9 percent increase in use of the R-2508 Complex. These increased levels of activity would be significantly below activity that occurred in the 1980s and 1990s and would be within the capacity of TRACON and the Federal Aviation Administration to manage.

Cumulative Effects

Alternatives A, B, and C would not be expected to have any significant cumulative impacts on air quality, noise, solid waste, socioeconomics, or any of the other issues analyzed in this EA. Analysis was completed by reviewing other flight-related actions that may occur in the same geographic area. The accepted U.S.EPA level of significance for sound in the areas that underlie the proposed action is 55 dB DNL. At no point would sound from the proposed action or alternatives reach this level. Air emissions for Kern County would remain below *de minimis* levels.

Unavoidable Adverse Impacts

The unavoidable adverse effects for the proposed action aircraft operations would be noise and air pollutants from aircraft emissions and potential bird-aircraft strikes. These effects cannot be avoided if these mission-essential flights are to be conducted. However, none of these effects are significant, as documented in this EA.

Short-Term Use of the Environment versus Long-Term Biological Productivity

Conducting these types of transient and new mission test flights would not directly involve contact or consumption of any biological resources. Noise is the primary effect that would reach the ground; however, there are no known noise impacts to plants or published reports that document significant impacts to wildlife at these noise levels. Studies related to low-level operations indicate minor impacts resulting from startle reactions are possible, but the startle reaction does not result in reductions in size of wildlife populations or other long-lasting effects. Aircraft operations may result in bird strikes; however, management techniques minimize the potential for bird strikes, which average 10 per year for operations at Edwards AFB.

Irreversible and Irretrievable Commitments of Resources

The proposed action would not involve any physical commitment or consumption of resources. While the proposed action would continue to use airspace when there are sorties, the airspace immediately returns to public availability when released from military use.

4.0 CONCLUSION

A finding of No Significant Impact (FONSI) for the Proposed Action and Alternatives has been determined based on the absence of significant impacts to the human environment. Therefore no environmental impact statement will be prepared. Background information that supports the research and development of the FONSI and the EA is on file at Edwards AFB and may be obtained by contacting:

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1 April 08

Date

FINAL

ROUTINE AND RECURRING SMALL TRANSIENT AND NEW TEST MISSIONS ENVIRONMENTAL ASSESSMENT

Lead Agency:	U.S. Air Force, Edwards Air Force Base (AFB)
Title of the Proposed Action:	Routine and Recurring Small Transient and New Test Missions Environmental Assessment
Affected Jurisdictions:	Tulare County, California Kern County, California Los Angeles County, California Inyo County, California Nye County, Nevada Eureka County, Nevada White Pine County, Nevada Esmeralda County, Nevada
Prepared by:	95th Air Base Wing and Air Force Flight Test Center Environmental Management Directorate Edwards Air Force Base, California
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ABSTRACT

The Air Force Flight Test Center at Edwards AFB, California proposes to add up to 25 aircraft, 2,000 sorties per year, and 1,500 military, government civilian, and contractor personnel to support small transient and new test missions that would operate at Edwards AFB and in the R-2508 Complex. This Environmental Assessment evaluates the potential effects of the proposed action, including major and minor construction that could be needed to support the proposed action or alternatives. Alternative A would include the complete contingent of aircraft, personnel, and major construction activities. The proposed action would result in a 20 percent increase over current operations at Edwards AFB and a 5.9 percent increase in use of the R-2508 Complex. These increased levels of activity would be significantly below activity that occurred in the 1980s and 1990s. Major construction would occur over a 3-year period, with the majority of the construction occurring during the first 2 years of the proposed action. Alternative B would be similar to Alternative A, except only minor construction would occur; Alternative C would use existing facilities, and Alternative D is the No-Action Alternative. Air emissions would be below *de minimis* values for Kern County pollutants of concern, and noise levels would add to the current noise but would still be below the annoyance threshold for sonic booms.

The effects of these alternatives are discussed in regards to air quality, airspace management and air safety, hazardous waste/solid waste, natural resources, noise, infrastructure, safety and occupational health, and socioeconomics. No significant impacts were identified during the impact assessment.

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1.0 PURPOSE AND NEED

1.1 INTRODUCTION

This Environmental Assessment (EA) evaluates the potential environmental effects associated with the proposed addition of a small flight test operation (up to 25 test aircraft and 1,500 military, government civilian, and contractor personnel) to Edwards Air Force Base (AFB), California, and the associated use of the R-2508 Complex. This EA is being prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321 *et seq*.); the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508); U.S. Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process* (EIAP); Title 32 CFR Part 989, which implements these regulations in the EIAP; and all other applicable federal and local regulations. The Air Force Flight Test Center (AFFTC) is representing the Department of Defense (DoD) as the lead agency.

1.2 LOCATION OF PROPOSED ACTION

The Proposed Action would occur primarily on Edwards AFB and within the R-2508 Complex. Edwards AFB is located in the Antelope Valley region of the western Mojave Desert in Southern California, about 60 miles northeast of Los Angeles, California. Portions of the base lie within Kern, Los Angeles, and San Bernardino counties. The Base occupies an area of approximately 301,000 acres or 470 square miles and is located entirely within R-2515 restricted airspace in the southern portion of the R-2508 Complex. The whole R-2508 Complex of special use airspace (SUA) occupies an area of approximately 19,600 square miles, extending from 45 miles north of Los Angeles, California, to 10 miles south of Bishop, California. The northeast corner of the R-2508 Complex crosses the Nevada state line and southeast corner is approximately 93 nautical miles from the southern tip of Nevada. The northwest boundary is approximately 65 nautical miles east of Fresno, California and the southwest boundary is approximately 25 nautical miles east of Bakersfield, California (Figure 1-1).

1.3 PURPOSE OF THE PROPOSED ACTION

The purpose of the Proposed Action is to provide a realistic test environment for an Air Force flight test squadron and the associated contingent of military and civilian personnel that would be required to maintain and test aircraft and associated weapon systems. This document serves as a programmatic

assessment of the environmental effects and identifies any mitigation that may be required to integrate these aircraft and personnel at Edwards AFB (within the R-2508 Complex).

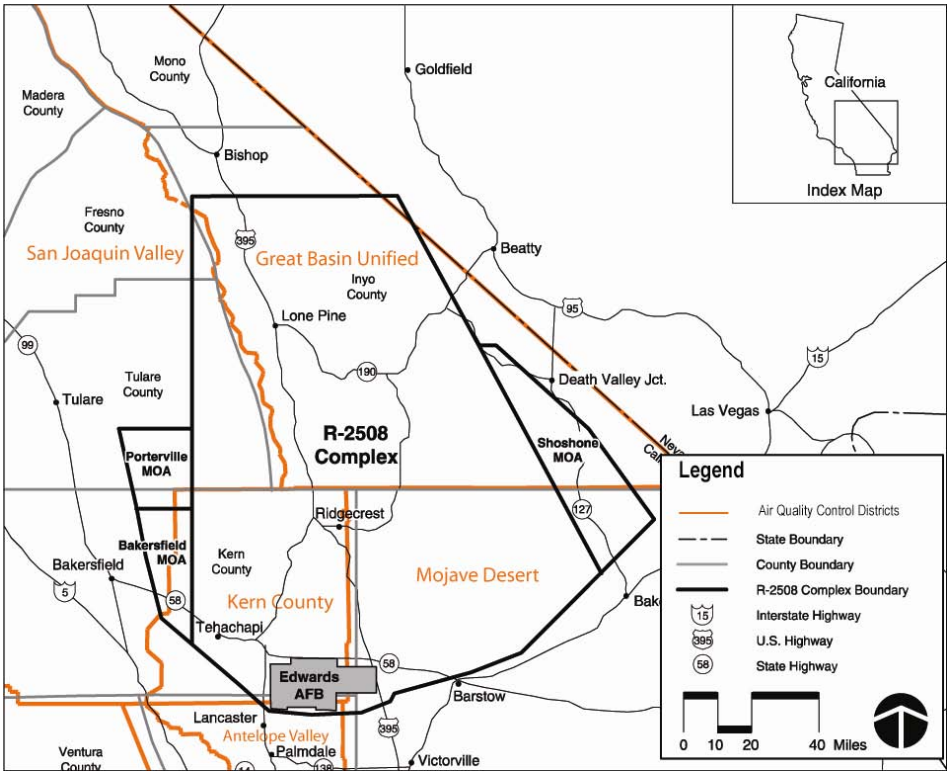

Figure 1-1 General Vicinity Map

Support personnel, aircraft, and aircrews would use existing airspace, existing test ranges, and existing facilities unless the mission dictates otherwise. The need for new facilities (either minor or major military construction [MILCON]) would be dependent on whether the current facilities could support state of the art and future weapon systems. The addition of new and experienced personnel would provide for the direct transfer of needed skills that could be used to support the changing mission requirements based on national and international threats and the needs of the Secretary of the Air Force.

1.4 NEED FOR THE PROPOSED ACTION

To fulfill the goals of the Office of the Secretary of Defense, the AFFTC needs to conduct test flights for the testing of new aircraft and aircraft systems, and training flights for the continued proficiency of test crews. Adding a new, small flight test organization at the AFFTC would support requirements for future aircraft and aircraft systems as they are developed by the U.S. Air Force and other government agencies.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section describes the Proposed Action and Alternatives, including the No-Action Alternative. The potential environmental impacts of each alternative are summarized in table form at the end of this chapter.

2.2 ALTERNATIVE IDENTIFICATION PROCESS

The analysis of the Proposed Action and Alternatives is the cornerstone of the EA. It is intended to provide the decision maker and the public a clear understanding of the relevant issues and the basis of the choice among identified options. The alternatives must fulfill the need and purpose of the Proposed Action and be consistent with the goals, policies, management strategy, and mission requirements of the AFFTC.

The criteria identified here establish a minimum set of requirements that must be met in order for an alternative to be considered viable. Those alternatives not meeting one or more of the selection criteria have been eliminated from further discussion. Alternatives meeting all selection criteria have been retained and each is analyzed in Chapter 4 (Environmental Consequences) of this EA.

The criteria used to select the alternatives discussed in this document are described below. They address the need to provide a realistic training and test environment for an Air Force flight test squadron and the associated contingent of military and civilian personnel that would be required to maintain and test aircraft and associated systems. A viable alternative would:

- Provide the infrastructure and facilities necessary to complete the test mission;
- Present a broad range of airspace test areas for testing aircraft and associated weapon subsystems;
- Allow full functioning of aircraft for complete system evaluation with specialized subsystems;
- Provide for testing that would meet the Secretary of Defense operational requirements;
- Include a wide range of targets and target areas for testing future weapons delivery system effectiveness;

- Support operation of all aircraft subsystems integration (e.g., electrical, hydraulic, avionics, engines, flight controls);
- Permit operations of aircraft and subsystems without restrictions that would invalidate test results; and
- Provide an environment that meets federal, state, and Air Force safety requirements.

2.3 DESCRIPTION OF THE ALTERNATIVES

The Region of Influence (ROI) for all alternates considered is the collection of special use airspace (SUA) known as the R-2508 Complex. The majority of aircraft flights will be conducted within the R-2508 Complex which includes the restricted area R-2515 and airspace over Edwards AFB. References to the "R-2508 Complex" in this document include all the special use airspace within the outer boundary of the multiple SUAs. A detailed description of the airspace for the proposed operating areas is provided in R-2508 Complex User's Handbook at http://www.edwards.af.mil/shared/media/document/AFD-070103-052.pdf. Most aircraft test and evaluation and training activities would occur within the R-2508 Complex airspace; however, some flight operations would also occur outside the R-2508 Complex. These flight operations would vary depending on specific test requirements. Approximately 5 percent of the flights would operate outside the boundaries of the R-2508 Complex. To best account for impacts, the analysis was done assuming flight operations requiring flight between the R-2508 Complex transitioning to the Federal Aviation Administration (FAA) controlled National Airspace System (NAS) would occur under an approved flight plan.

Table 2-1 lists the projected/estimated maximum additional aircraft flight operations that would occur for different types of aircraft for any of the alternatives. The proposed number of flights would be approximately 20 percent of flight operations that normally occur at Edwards AFB (e.g., Edwards AFB averages 10,000 operations per year; therefore, up to 2,000 additional operations per year could occur from 2008–2014). For purposes of analysis, each aircraft operation would include one takeoff, approach, touch-and-go, and one landing at Edwards AFB.

Table 2-1

Projected/Estimated Small Transient and New Test Missions

Aircraft Operations Originating at Edwards AFB (2008–2014)

Type of Aircraft[1]	**A-10**	**F-15**	**F-16**	**F-22**
Number of Sorties[2]	400	150	1,200	250

Note: 1 These aircraft types were selected as likely candidates as transient or new mission aircraft. Other aircraft could be used as long as effects were similar.
2 Numbers of aircraft operations per year.

2.3.1 Alternative A (Additional Test Flight Operations and Major Military Construction) (Proposed Action)

The total number of aircraft flights for Alternative A, which are the same as all other alternatives is listed in Table 2-1. The primary difference between Alternative A and the other alternatives would be the extent of ground activities, including major military construction that would include additional squadron support facilities for personnel and aircraft. Construction activities would be limited to the cantonment area of Edwards AFB.

2.3.1.1 Ground Activities

Ground activities would consist of ground system testing, maintenance, preparation, and flight tracking activities. Both scheduled and unscheduled maintenance activities would occur. Scheduled maintenance activities would include preflight and post-flight activities. Typical maintenance activities would include corrosion control, low-observable repair, wash down, system/subsystem repair, and servicing. Servicing would include adding petroleum, oil, hydraulic fluids, fuels, coolants, and refrigerants to the systems; using solvents, sealants, epoxies, solder, and adhesives for repair activities; and charging and replacing batteries. Aircraft would be fueled on the ramp or in the hangar. Preflight checks would be conducted prior to each takeoff and would include pre-launch inspection and taxiing the aircraft to the active runway. Maintenance and flight preparation activities would occur in existing hangars, facilities, or on the ramp; or in new facilities constructed to support the squadron aircraft. Air Force and AFFTC Instructions would govern ground activities.

2.3.1.2 Flight Activities

Flight activity could include any operations within the capabilities of the aircraft and aircrew including the use of training routes; supersonic tests along the Alpha/Precision Impact Range Area (PIRA) Supersonic Corridor, High Altitude Supersonic Corridor, or Black Mountain Supersonic Corridor; and weapons testing on one of the various the DoD ranges. Flight activities outside the R-2508 Complex would be governed by FAA, Air Force, and DoD regulations.

2.3.1.3 Construction Activities

Major military construction could include the activities required to build up to 136,150 square feet of hangar and maintenance space, up to 405,000 square feet of aircraft parking, and access to the taxiways, access roads, parking lots, and other elements of the infrastructure.

2.3.1.4 Personnel Requirements

Historically, the number of personnel supporting flight test programs at Edwards AFB and National Aeronautics and Space Administration Dryden Flight Research Center (NASA DFRC) remains constant. Some government personnel would be reassigned from closing programs to support these additional requirements. Contractors associated with various aircraft program experience would replace those contractors leaving the completed programs; however, up to a total of 1,500 new personnel would be required to support the additional 25 aircraft.

2.3.2 Alternative B (Additional Test Flight Operations and Minor Military Construction)

The flights shown in Table 2-1 and conducted under Alternative B would also operate throughout R-2508 Complex airspace. Flight and ground activities for Alternative B would be similar to those activities described in Alternative A. Minor military construction would include additional squadron support facilities for personnel.

2.3.2.1 Construction Activities

Minor military construction could include the activities required to build up to 35,000 square feet of office space, access roads, parking lots, and other elements of the infrastructure. Any construction activities conducted under Alternative B would be subject to the constraints of the *Programmatic Environmental Assessment for Small Building Construction, Relocation, and Modification at Edwards AFB, California* (Air Force Flight Test Center 1998c).

2.3.2.2 Personnel Requirements

Personnel requirements under Alternative B would be the same as described for Alternative A and as addressed in Section 2.3.1.4.

2.3.3 Alternative C (Additional Test Flight Operations)

The flights proposed in Table 2-1 and conducted under Alternative C would operate throughout R-2508 Complex airspace. Flight and ground activities for Alternative C would be similar to those activities described for Alternative A. No new construction would be required. Existing facilities would be used for squadron aircraft, aircrews, maintenance personnel, and support contractors. Personnel requirements would be similar to those identified under Alternatives A and B.

2.3.4 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted at the rate and manner currently planned. These programs would continue to use existing facilities and buildings that would be modified on an as-needed basis. The existing workforce would be sufficient to complete these programs as planned.

2.4 ISSUES AND CONCERNS

During the scoping process, the following issues and concerns were identified as requiring assessment when considering the potential environmental impacts of the alternatives.

- Air Quality. Air pollutant emissions generated from aerospace ground equipment (AGE) and vehicle miles traveled in support a squadron of 25 aircraft and 1,500 military, government civilian, and contractor personnel and their estimated 2,700 dependents would be similar to emissions produced at other bases. Because portions of the R-2508 and the airspace below 3,000 feet above ground level at Edwards AFB are in various stages of attainment, maintenance, and non-attainment, the potential air quality impacts need to be analyzed.

- Airspace Management and Air Safety. Use of the R-2508 Complex for an additional 25 test aircraft could result in up to 2,000 flights annually. Consequently, the potential impact on the airspace, flight operations, and air safety needs to be analyzed.

- Hazardous Materials and Waste/Solid Waste. The aircraft would use hazardous materials that would generate hazardous waste similar to that from other aircraft flight activities operating from Edwards AFB. Approximately 3.09 pounds of solid waste are produced per person per day. Adding 1,500 personnel may impact the lifespan of the landfill.

- Natural Resources. Potential impacts to natural habitat may result during test flights; however, these potential impacts would be the same as from other aircraft using the airspace above these resources.

- Noise. Potential impacts due to traffic, ground and flight activities, and construction activities will be assessed. Noise impacts to wildlife are not anticipated.

- Infrastructure. Any major or minor military construction could cause a change in infrastructure; consequently additional environmental analysis needs to be performed.

- Safety and Occupational Health. Maintenance and flightline personnel could be exposed to hazardous substances while performing routine maintenance activities.

- Socioeconomics. The addition of 1,500 military and contractor personnel and their dependents (approximately 2,700 dependents) to the area could create impacts due to the need for additional housing, schools, and jobs. Adding 4,200 people would also increase spending in the local economy.

2.5 ISSUES AND CONCERNS CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

The following issues and concerns were initially considered, but subsequently eliminated from further analysis in this EA. No potential for impacts was identified for these resource areas due to the nature of the Proposed Action. Consequently, they will only be briefly addressed below.

- Cultural Resources. Cultural resources could be impacted when flight operations including weapons testing against existing target sites and the weapons miss their target or if personnel checking targets fail to abide by prescribed procedures established to minimize any impacts on cultural artifacts on base. For Alternatives A and B, construction would occur on previously disturbed areas or areas surveyed and known not to contain any significant cultural or historic resources. For Alternatives C and D, no new construction is anticipated, existing facilities would be used, and flight operations would be limited to previously disturbed areas to the maximum extent possible; no significant impacts would be anticipated for any of the action alternatives.

- Environmental Justice and Protection of Children. The Executive Orders (EOs) on Environmental Justice and the protection of children require federal agencies to identify and address disproportionately high adverse effects of their activities on minority and low-income populations and children. The proposed activities discussed in this EA were reviewed against EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health and Safety Risks*. Given that no

renovation/construction activities off-base are planned for this Proposed Action, other renovation/construction activities would occur entirely on the base, and flight operations would be conducted on preexisting ranges, the U.S. Air Force has determined that this action would have no substantial, disproportionate impacts on minority and low-income populations and/or children because of the general lack of any potential exposure.

- Geology and Soils. The impact of aircraft flight on geology and soil is inherently insignificant. The release of weapons on targets and on the ranges has been analyzed in other documents and resulted in less than significant impacts.

- Land Use. The aircraft could perform flights that release inert weapons (or high explosive bombs at PB-13) or fire lasers at targets on the ranges as identified in test plans reviewed by the Test System Safety Officer and Range Control Office. Targets would be located in designated areas previously evaluated by 95th Air Base Wing Environmental Flight (95ABW/CEV) and approved for testing. No changes to land use are proposed.

- Public/Emergency Services. The primary operating areas for the Proposed Action are on Edwards AFB and within the R-2508 Complex. Access to Edwards AFB is restricted to personnel having a specific need to be on the base, thus limiting the general access to squadron flight operations and maintenance areas. Provisions for public and emergency services are established for the base and the communities within the R-2508 Complex as necessary to meet the needs of the AFFTC mission; therefore, this action would have no substantial impact on public/emergency services.

- Water Resources. If not properly managed, the chemicals associated with aircraft test and evaluation flight activities could be released into the water systems and have an effect on water quality and water resources. All aircraft test and evaluation programs would be governed by existing water quality management regulations and management plans, impacts on water resources would be controlled and thus would be less than significant.

2.6 OTHER FUTURE ACTIONS IN THE REGION

Other actions within the region were identified based on review of the *Federal Register*, requests for local permits, and planning documents to determine whether cumulative environmental impacts could result from implementation of the Proposed Action and Alternatives. Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Other actions within the geographic region of Edwards AFB and the R-2508 Complex were considered to determine their potential for cumulative effects created by other flight test programs. Cumulative effects will be discussed in Chapter 4. Because appropriate range safety requirements are in place to ensure a safe environment to conduct flight tests, along with coordination with the FAA, these actions are not expected to have significant cumulative impacts.

2.7 SUMMARY OF IMPACTS

According to the analysis in the EA, implementation of the Proposed Action, Alternative A or any of the proposed alternatives would result in no significant environmental impacts in any resource category. Implementing the Proposed Action would not significantly affect existing conditions at Edwards AFB or within the R-2508 Complex. The following table summarizes and highlights the results of the analysis by resource category.

Table 2-2 Summary of Potential Impacts

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Air Quality–Below *de minimis* for all Alternatives	• Emissions generated by construction, demolitions, and paving would be localized and temporary. • Maximum emissions of any criteria pollutant would not exceed *de minimis* thresholds or contribute to more than 0.005 percent of the regional totals. • Maximum emissions of nitrogen oxides (NO_x) would be estimated at 36.21 tons/year and maximum volatile organic compounds (VOCs) at 18.78 tons/year.	• Emissions generated by construction, demolitions, and paving would be localized and temporary. • Maximum emissions of any criteria pollutant would not exceed *de minimis* thresholds or contribute to more than 0.005 percent of the regional totals. • Maximum emissions of NO_x would range from 31.45 tons/year to 36.21 tons/year and maximum VOCs would range from 17.89 tons/year to 18.78 tons/year, depending on the construction activities.	• Maximum emissions of any criteria pollutant would not exceed *de minimis* thresholds or contribute to more than 0.005 percent of the regional totals. • Maximum emissions of NO_x would be estimated at 36.21 tons/year and maximum VOCs at 17.89 tons/year.	• No change to projected emissions generated by other programs.

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Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Airspace Management	• A 5.9 percent increase over current average number of flights in the R-2508 Complex and 20 percent increase at Edwards AFB. • The number of sorties would remain below 1995 baseline levels. • Within the capacity of Edwards AFB and TRACON to manage.	• Same as Alternative A.	• Same as Alternative A.	• The number of sorties would remain below 1995 baseline levels.
Hazardous Materials/Waste/ Solid Waste	• No new waste streams would be created, and hazardous materials would not change. • Total hazardous waste would increase up to 6.1 percent. • Construction and demolition debris would be disposed off-base. No net increase in solid waste at base landfill.	• Same as Alternative A.	• Same as Alternative A.	• No changes to baseline conditions on Edwards AFB would be anticipated.

Table 2-2, Page 2 of 7

Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Natural Resources	• No adverse impacts on vegetation or wildlife from the proposed action. • If burrowing owls, Mohave ground squirrel, or desert tortoises exist in or near construction areas, appropriate mitigation and protection measures would be implemented prior to construction. • Informal consultation with the U.S. Fish and Wildlife Service (USFWS) and coordination with California Department of Fish and Game would continue to ensure no significant impact on natural resources would occur.	• Same as Alternative A.	• No adverse impacts on vegetation or wildlife from the proposed action.	• No changes to baseline conditions on Edwards AFB would be anticipated.

Table 2-2, Page 3 of 7

Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Noise	• The addition of up to 25 aircraft would not increase sorties beyond 1990 baseline levels, so noise levels would not change. • Noise during major construction and demolition would be localized and temporary. Minimization measures would be implemented to reduce the potential for disturbances. • Less than 1 additional sonic boom per day would be expected to occur; cumulative noise would still be below the annoyance threshold of 5 sonic booms per day at Edwards AFB.	• The addition of up to 25 aircraft would not increase sorties beyond 1990 baseline levels, so noise levels would not change. • Noise during minor construction and demolition would be localized and temporary. Minimization measures would be implemented to reduce the potential for disturbances. • Less than 1 additional sonic boom per day would be expected to occur; cumulative noise would still be below the annoyance threshold of 5 sonic booms per day at Edwards AFB.	• The addition of up to 25 aircraft would not increase sorties beyond 1990 baseline levels, so noise levels would not change. Minimization measures would be implemented to reduce the potential for disturbances. • Less than 1 additional sonic boom per day would be expected to occur; cumulative noise would still be below the annoyance threshold of 5 sonic booms per day at Edwards AFB.	• Baseline noise conditions would not change.

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Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Infrastructure	• Additional infrastructure requirements would increase by less than 10 percent over current levels, but would be below 1990 baseline levels. • The demand on utilities (water, sewer, electrical, etc. would remain below 1990 baseline levels.	• Additional infrastructure requirements would increase by less than 10 percent over current levels, but would be below 1990 baseline levels. • The demand on utilities (water, sewer, electrical, etc. would remain below 1990 baseline levels.	• Additional infrastructure requirements would increase by less than 10 percent over current levels, but would be below 1990 baseline levels. • The demand on utilities (water, sewer, electrical, etc. would remain below 1990 baseline levels.	• Baseline infrastructure conditions would not change.

Table 2-2, Page 5 of 7

Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Safety and Occupational Health	• Military flight operations are inherently dangerous; however, impacts on human health and safety would be minimized through implementation of standard health and safety regulations and Air Force instructions and policies. • Construction activities would be conducted utilizing Best Management Practices which would be included as part of all construction safety plans.	• Military flight operations are inherently dangerous; however, impacts on human health and safety would be minimized through implementation of standard health and safety regulations and Air Force instructions and policies. • Construction activities would be conducted utilizing Best Management Practices which would be included as part of all construction safety plans.	• Military flight operations are inherently dangerous; however, impacts on human health and safety would be minimized through implementation of standard health and safety regulations and Air Force instructions and policies.	• Baseline safety and occupational health conditions would not change.

Table 2-2, Page 6 of 7

Table 2-2 Summary of Potential Impacts (Continued)

Resource Category	Alternative A Major MILCON	Alternative B Minor MILCON	Alternative C No Construction	Alternative D No-Action Alternative
Socioeconomics	• Population increases of 4,200 personnel would not exceed baseline levels for 1980, 1990, and 2000 census. Population increases in the local area would be less than 0.5 percent. • Revenue in region would increase during the construction period and as a result of the increase in expenditures from the additional personnel; a positive increase in economic conditions would be expected. • A 1.3 percent increase in enrollment would occur at local schools.	• Population increases of 4,200 personnel would not exceed baseline levels for 1980, 1990, and 2000 census. Population increases in the local area would be less than 0.5 percent. • Revenue in region would increase during the construction period (but less than if major construction were to occur as in Alternative A). Expenditures from the additional personnel would result in a positive increase in economic conditions. • A 1.3 percent increase in enrollment would occur at local schools.	• Population increases of 4,200 personnel would not exceed baseline levels for 1980, 1990, and 2000 census. Population increases in the local area would be less than 0.5 percent. • Revenue in region would increase as a result of the increase in expenditures from the additional personnel. • A 1.3 percent increase in enrollment would occur at local schools.	• No change to socioeconomic projections by the economic development council would be anticipated.

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3.0 AFFECTED ENVIRONMENT

This chapter describes existing environmental conditions likely to be affected by Alternatives A, B, C, and D. The ROI primarily consists of the R-2508 Complex which includes restricted area R-2515 and the airspace over Edwards AFB.

- Environmental resources and impacts for these ROIs have been discussed in detail in 15 separate NEPA analyses, which are listed in Appendix H.

Based on the assessment of the Proposed Action and Alternatives and the data in the above references, it was determined that there is a potential for the following resources to be affected: air quality, airspace management and air safety, hazardous materials/waste, natural resources, noise, infrastructure, safety and occupational health, and socioeconomics.

3.1 AIR QUALITY

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. By comparing a pollutant concentration in the atmosphere to federal and/or state ambient air quality standards, the significance of its presence can be determined. Supplemental air quality data are provided in Appendix A; national and state ambient air quality standards for California are shown in Appendix A, Table A.1-1.

A summary of attainment designations for the various air basins in the ROI show that Inyo County/Great Basin Unified Air Basin (GBUAB) is the only air basin in attainment for ozone for national standards. All other air basins in the ROI are in non-attainment for ozone. Inyo County/GBUAB is unclassified for the California standards. All air basins in the ROI are in attainment, unclassified/attainment, or unclassified for carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). All air basins in the ROI are in non-attainment for particulate matter equal to or less than 10 microns in diameter (PM_{10}) standards except for the Los Angeles/Mojave Desert Air Basin (MDAB), which is unclassified for the national PM_{10} standards and Kern County, which is unclassified for the California PM_{10} standard. The current attainment status for areas under the jurisdiction of Kern County Air Pollution Control District (KCAPCD) in shown in Appendix A, Table A.1-3 and attainment status each county/air basin in the ROI is shown in Appendix A, Table A.1-4.

The United States Environmental Protection Agency (U.S. EPA) typically uses 3,000 feet above ground level (AGL) as the default mixing height that inhibits the rapid vertical transfer of air. Pollutants emitted

above the mixing height become diluted in the very large volume of air in the troposphere before they are slowly transported down to ground level. These emissions have little or no effect on ambient air quality. Therefore, air quality impacts below 3,000 feet AGL are the emphasis of the air quality assessment analysis. The majority of emissions from criteria air pollutants, or precursors thereof, for the Proposed Action and Alternatives are expected to occur above the mixing height of 3,000 feet AGL. Approximately 5 percent of the flight time for consolidated mission events would generate emissions below 3,000 feet AGL and would be associated with takeoff and landing at Edwards AFB.

3.1.1 Existing Conditions in the R-2508 Complex

Air emissions above and below 3,000 feet AGL would occur. The climate of the R-2508 Complex and existing conditions are a matter of public record as described in the *R-2508 Environmental Baseline Study* completed in August 1997 and updated in 2005 (95 Air Base Wing [ABW] and AFFTC 2005a). Supplemental information is also shown in Appendix A.

The R-2508 Complex extends into portions of Kern, Tulare, Fresno, Inyo, Los Angeles, and San Bernardino Counties and spans three air basins: the MDAB, the San Joaquin Valley Air Basin, and the Great Basin Valleys Air Basin. Four local air districts maintain jurisdiction over the area: the KCAPCD, the San Joaquin Valley Air Pollution Control District (SJVAPCD), the Great Basin Unified Air Pollution Control District, and the Mojave Desert Air Quality Management District (MDAQMD) (Figure 1-1).

3.1.2 Existing Conditions in Restricted Area R-2515 and Edwards AFB

Restricted area R-2515, which is a subset of the R-2508 Complex, extends into portions of Kern, Los Angeles, and San Bernardino Counties and is part of the MDAB, which includes local air districts that maintain jurisdiction over the area: the KCAPCD, the Antelope Valley Air Quality Management District (AVAQMD), and the MDAQMD. Most of the region is in non-attainment of both state and national standards for PM_{10} and ozone (California Environmental Protection Agency 2007). The area is in attainment or unclassified for the remaining criteria pollutants including CO, NO_2, and SO_2.

Eastern Kern County is located on the western edge of the Mojave Desert and is separated from populated valleys and coastal areas to the west and south by several mountain ranges. These valleys and coastal areas are the major source of ozone precursor emissions affecting ozone exceedances within Kern County's part of the MDAB. Although the sources of pollution in eastern Kern County do not by themselves result in exceedances of the federal ozone standards, this region is largely impacted by ozone transport from both the San Joaquin Valley Air Basin and the South Coast Air Basin. Elevated levels of

PM_{10} are primarily associated with fugitive dust, which is produced through a combination of high winds, dry soil conditions resulting from an arid climate, and ground-disturbing activities such as mining, agriculture, and construction. The main base at Edwards AFB is located in the eastern portion of Kern County, which is under the jurisdiction of the KCAPCD and is the largest contributor to air emissions. Because those activities proposed herein that could impact air quality would mainly occur on the main base, discussions of environmental effects to air quality are analyzed in relation to baseline air quality in the KCAPCD. Table 3-1 provides a summary of aircraft emissions at Edwards AFB in 2004 for comparison to the flights associated with the consolidated flight test missions proposed by this EA. These are baseline quantities for emissions below the mixing layer of 3,000 feet AGL for operations occurring on Edwards AFB.

Table 3-1

Summary of Existing Emissions at Edwards AFB (tons/year)

VOC	CO	NO_x	SO_2	PM_{10}
204.82	457.55	195.82	18.63	11.95

Notes: Represents emissions that occurred in 2004 (Air Force Flight Test Center 2005).
CO carbon monoxide
NO_x nitrogen oxides
PM_{10} particulate matter equal to or less than 10 microns in diameter
SO_2 sulfur dioxide
VOC volatile organic compound

The MDAB is currently impacted by fugitive dust emissions. Edwards AFB is situated in the MDAB portion of Kern County; therefore, current and forecasted baseline emissions, including PM_{10} emissions, for this portion of Kern County are listed in Table 3-2.

Table 3-2

MDAB Portion of Kern County

Baseline and Forecasted Emission Baseline (tons/year)

Year	VOC	NO_x	PM_{10}
1985[a]	8,395	9,855	9,855
1990[a]	7,665	14,235	16,060
1995[a]	4,745	10,585	10,585
2000[a]	4,380	11,315	11,315
2005[a)]	4,749	13,275	11,315
2010[b]	4,387	12,928	11,315
2015[b]	4,592	13,319	11,315
2020[b]	4,555	13,319	11,315

Table 3-2 (Continued)

MDAB Portion of Kern County

Baseline and Forecasted Emission Baseline (tons/year)

Notes: a actual
b estimated
NO_x nitrogen oxides
PM_{10} particulate matter equal to or less than 10 microns in diameter
VOC volatile organic compound

Source: Buetelman 2007; California Environmental Protection Agency 2006

For KAPCD, MDAQMD, and AVAPCD, the regional planning emission inventories for each district for ozone precursor pollutant (NO_x and VOC) emissions are included in the California State Implementation Plan. Table 3-3 shows the baseline and 10-percent threshold values for each of the three air districts with jurisdiction over Edwards AFB.

Table 3-3

1990 Baseline and 10-Percent Threshold Values

	1990 Baseline Values (tons/year)			10-Percent Threshold (tons/year)		
District	**NO_x**	**VOC**	**PM_{10}**	**NO_x**	**VOC**	**PM_{10}**
AVAPCD	10,220	12,775	N/A	1,022	1,277.5	N/A
KCAPCD	14,965	6,205	N/A	1,496.5	620.5	N/A
MDAQMD	41,610	16,790	34,310	4,161	1,679	3,431

Notes: AVAQMD Antelope Valley Air Pollution Control District
KCAPCD Kern County Air Pollution Control District
MDAQMD Mojave Desert Air Quality Management District
NO_x nitrogen oxides
PM_{10} particulate matter equal to or less than 10 microns in diameter
VOC volatile organic compound

3.2 AIRSPACE MANAGEMENT AND AIR SAFETY

This section provides a brief overview of the airspace and air safety measures for the affected environment. A detailed description can be found in Appendix B and the R-2508 Users Handbook, which can be accessed at http://www.edwards.af.mil/shared/media/document/AFD-070103-052.pdf.

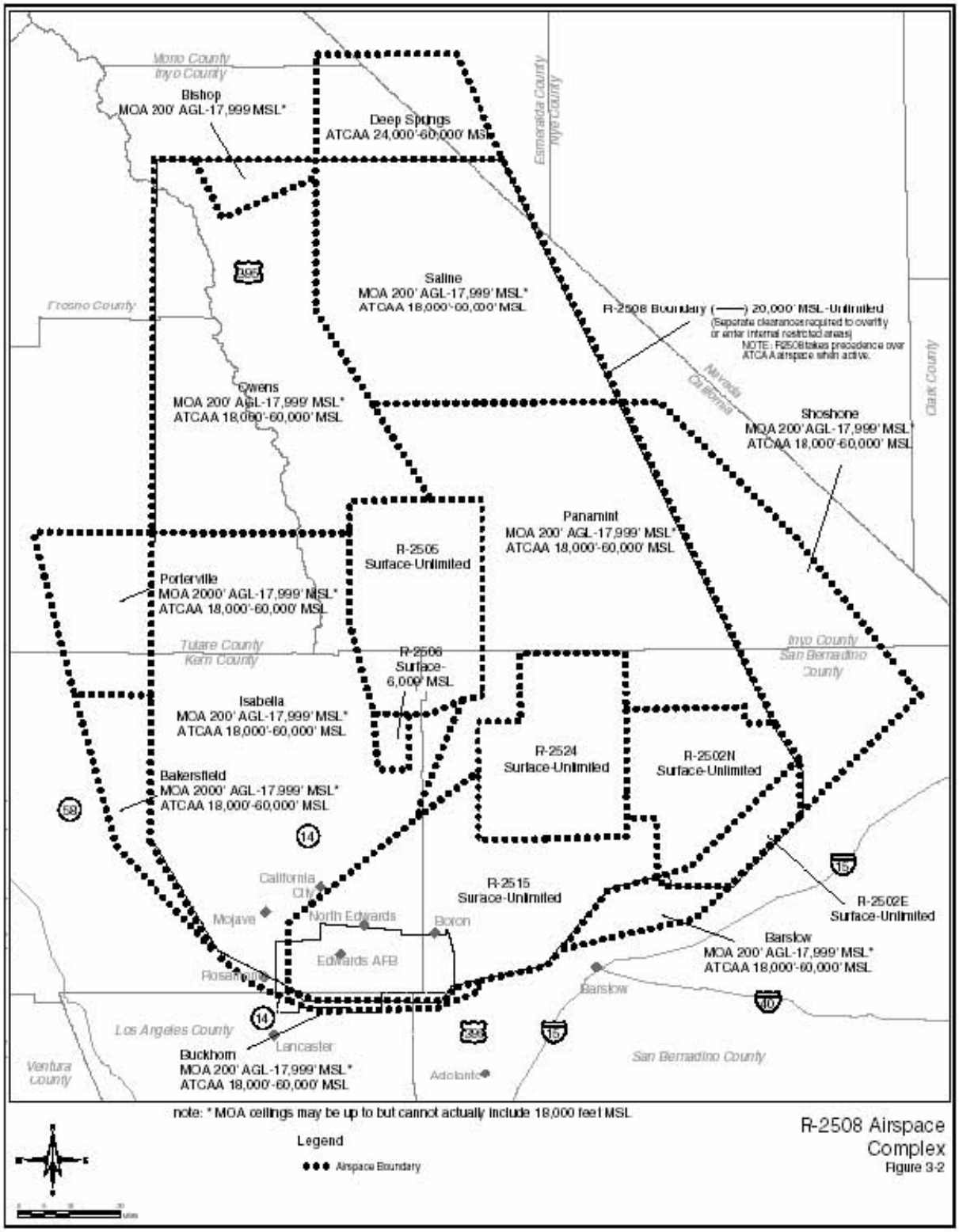
The primary airspace affected by the Proposed Action and Alternatives is the airspace within the R-2508 Complex: 19,600 square miles that extends for 140 miles north to south (Bishop, California, to Edwards AFB, California) and 110 miles east to west (Nevada state line to approximately 25 miles east of Bakersfield, California). There are 7 restricted areas and 11 military operating areas within the R-2508 Complex (Figure 3-1). The airspace is scheduled, monitored, regulated, and controlled to provide safe aircraft test areas. The average number of flights ranges from approximately 185 per day over the entire R-2508 Complex to approximately 40 per day at Edwards AFB. Flights include low-level test and training flights along pre-established routes, flight tests within the restricted areas and military operating areas, and flights transitioning to other FAA controlled airspace. Supersonic flights are routinely conducted, but occur only over approved areas. Only one established commercial air traffic route transects the R-2508 Complex; however, that route is normally closed during daylight hours on Monday through Friday. There are 16 small airports or airfields and two military airfields (Edwards AFB and Naval Air Weapons Station [NAWS] China Lake) within the R-2508 Complex. Flight activity within the R-2508 Complex SUA is controlled by the FAA.

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE/SOLID WASTE

3.3.1 Hazardous Materials and Hazardous Waste

A hazardous material is any material that may cause or contribute to adverse effects in organisms or their offspring; pose a substantial present or future danger to the environment; or result in damage to or loss of equipment, property, or personnel. Hazardous wastes are substances that have been "abandoned, recycled, or are inherently waste like," and that (because of their quantity, concentration, or characteristics) may cause increases in mortality or serious irreversible illness, or pose a substantial hazard to human health or environment if improperly treated, stored, transported, or disposed of. Solid waste refers to non-hazardous discarded solid material resulting from residential, commercial, and industrial activities or operations. Solid waste can be classified as construction/demolition waste, non-hazardous recyclable waste, or non-hazardous non-recyclable waste.

The only significant quantities of hazardous materials, hazardous waste, and solid waste originating from AFFTC and NASA DFRC flight operation are managed, used, and disposed of within the geographic boundaries of Edwards AFB. Edwards AFB, including NASA DFRC, uses a wide variety of hazardous materials in support of research activities on base and its mission requirement to support all types of aircraft. Hazardous materials are used for aircraft repair and maintenance, aircraft launch and recovery,



Source: Edwards AFB 2007

Figure 3-1

Areas of Controlled Airspace for the Proposed Action and Alternatives

aerospace ground equipment repair and maintenance, building remodeling, and construction. Some of the most commonly used hazardous materials include jet and motor fuel, other types of petroleum products, paints, thinners, adhesives, cleaners, lead-acid batteries, hydraulic fluids, and halogenated and non-halogenated solvents (U.S. Air Force 1995b).

Hazardous materials are used to support rocket propulsion research and development at the AFRL. Typical hazardous materials used include liquid and solid rocket propellants. Other hazardous materials used at the AFRL include batteries, antifreeze, cleaning/degreasing solvents, and machinery lubricants, which are used in component fabrication, repair, maintenance, and assembly operations (AFFTC 1998a).

Building and facility maintenance requires the use of heating fuels, paints, aerosols, and fluorescent lamps, all of which are hazardous materials.

Edwards AFB and NASA DFRC use the pharmacy concept to issue hazardous materials for use by all personnel. Implementation of the Hazardous Materials Pharmacy approach in the 1980s accomplished several important management goals, including reducing the volume of hazardous materials purchased and hazardous wastes generated through improved materials management. The Hazardous Materials Pharmacy monitors shelf life and tracks usage of hazardous materials on base. One common database is used to manage issued hazardous material products. Hazardous materials purchased through the pharmacy are bar code labeled upon their arrival at Supply Central Receiving and distributed to the various satellite issue points or Hazardous Materials Distribution Support Centers located throughout Edwards AFB.

All organizations and contractors are required to maintain inventories of all their hazardous materials. Furthermore, organizations are required to reduce the quantity of hazardous materials used or replace them with non-hazardous material, if possible, as a part of the Pollution Prevention Program. Guidelines used by Edwards AFB include AFI 32-7086, *Hazardous Materials Management*; AFI 32-7042, *Solid and Hazardous Waste Compliance*; and Air Force Flight Test Center Instruction 23-1, *Hazardous Material Management Program.*

3.3.2 Solid Waste

Edwards AFB operates a Class III solid waste landfill. The remaining capacity for the landfill is 386,659 cubic yards for refuse and is currently estimated to last through 2024 based on a disposal rate of 9,929 tons per year (Edwards AFB 2004b). New contracts for construction and demolition of facilities or

buildings may include requirements to dispose of construction and demolition debris off-base (Reinke 2007).

3.4 NATURAL RESOURCES

Biological resources are defined as terrestrial and aquatic ecosystems along with the native plants and animals that occur throughout these ecosystems. This includes plant populations and communities, wildlife populations and their relationship to habitat, and aquatic habitat and riparian ecosystems. Plant and animal species that are proposed or candidates for listing, or are listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS), and species having equivalent status at the California state level, are referred to as special-status species and are given special consideration by law for their preservation. The USFWS identifies primary physical and biological constituent elements of an area designated as critical habitat that are essential to the conservation of the species (50 CFR 424.12). Primary constituent elements may include, but are not limited to, roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetlands or drylands, water quality or quantity, host species or plant pollinators, geological formations, vegetation types, tides, and specific soil types (50 CFR 424.12). This section provides a brief summary of natural resources that may be encountered by implementing the Proposed Action and Alternatives. Additional information and details are provided in the *Final Integrated Natural Resources Management Plan for Edwards Air Force Base, California* (Edwards AFB 2004a).

Under Section 7 of the Endangered Species Act (ESA), consultation with the USFWS is required for federal projects if impacts may affect listed species or critical habitat; conference is required if such action is likely to jeopardize the continued existence of a proposed species or to adversely modify proposed critical habitat. The Air Force developed management goals and objectives as specified in Integrated Natural Resource Management Plan (INRMP) as required by the Sikes Act. The INRMP provides guidance for protecting sensitive species, sensitive communities, and habitats recognized by state and local agencies when evaluating impacts of a project.

The following sections provide an overview of the plants and wildlife found within the R-2508 Complex. A detailed description of the species can be found in the following public documents: *R-2508 Complex Environmental Baseline Study* (95 ABW and AFFTC 2005a), *Final Integrated Natural Resources Management Plan for Edwards AFB, California* (Edwards AFB 2004a), and Appendix C.1.

3.4.1 Plants

Plant communities within most of the R-2508 Complex include species that are adapted to the environments of the Mojave Desert. These include creosote bush scrub, Joshua tree woodland, arid-phase saltbush, halophytic phase saltbrush scrub, xerophytic saltbrush scrub, and mesquite woodland. The western portion of the R-2508 Complex overlies the Sierra Nevada Range and a portion of the San Joaquin Valley. The vegetation in these regions is substantially different from the xeric vegetation found within the Mojave Desert. Mountain slope elevation and the accompanying microclimate gradient results in a zonation of plant communities on the east- and west-facing slopes. The elevation distribution of plant communities largely accounts for the habitat variety found on the land under the boundaries of the R-2508 Complex.

Several coniferous forest types occur in the Sierra Nevada Range. Sub-alpine forests are dominated by high-elevation pines and alpine habitats at high elevations in the Sierra Nevada Range. Foothill grasslands are dominated by various grass species. Foothill woodlands are dominated by oaks at lower elevations and certain pines at upper elevations on the western side of the Sierra Nevada's. Various non-desert scrub communities are also common in the ROI. Scrub communities found within the ROI include shadscale scrub, chaparral, and sage-grass (also known as sagebrush grassland).

3.4.2 Wildlife

Wildlife species occurring within the ROI include species adapted to a variety of habitats. Several federally and state-protected species that may be found within the ROI are discussed in the Threatened and Endangered Species section and Appendix C.1.

Wildlife within the Mojave Desert includes native species of rats, bats, mice, coyotes, and bobcats. Reptiles common to all desert habitats include lizards, whiptails, boas, and rattlesnakes.

The Migratory Bird Treaty Act and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, identify requirements for the protection of migratory birds. Migratory birds will use airspace that would be used by aircraft under the Proposed Action and Alternatives. Birds are very mobile species and tend to occupy favored habitats within their range. Common bird species found within the R-2508 Complex include the red-tailed hawk, killdeer, white-crowned sparrow, turkey vultures, ravens, chickadees, warblers, nutcrackers, sapsuckers, larks, orioles, vireos, magpies, kites, scrub jays, wrentits, wrens, woodpeckers, flickers, owls, bushtits, and meadowlarks. Seasonal migrants include bluebirds,

dark-eyed juncos, and white-crowned sparrows. Large birds and bird flocks are known to present hazards to aircraft, typically below 5,000 feet AGL, depending upon local terrain.

Amphibians typically found in the R-2508 Complex include salamanders, toads, and frogs. Mammals found in the R-2508 Complex habitats include black bear, mountain lions, rabbits, foxes, woodrats, weasels, squirrels, mule-deer, bats, and yellow-bellied marmots.

3.4.2.1 Threatened and Endangered Species in the R-2515 and Edwards AFB

Fifty sensitive animal species that are listed federally as protected, endangered, threatened, or species of concern, or listed by the state as endangered, threatened, or species of concern have been documented in this ROI. This includes 4 reptile species, 8 mammal species, and 38 bird species. Table 3-4 is a list of sensitive wildlife species and habitats which occur in this area. It also includes their respective federal and state status. The list of sensitive species was obtained using the Natural Diversity Database (NNDB) in association with geographic information system (GIS) data for the defined R-2515 airspace boundary, which is the most likely affected portion of the ROI. Sensitive biological resources in the area include federally listed species as reported by the California Department of Fish and Game (CDFG) CNDDB and designated critical habitat. The ten federally listed wildlife species include: desert tortoise (*Gopherus agassizii*), Chuckwalla (*Sauromalus obesus*), Mohave ground squirrel (*Spermophilus mohavensis*), Western mastiff bat (*Eumops perotis californicus*), Ferruginous hawk (*Buteo regalis*),Loggerhead shrike (*Lanius ludovicianus*), Mountain plover (*Charadrius montanus*), California least tern (*Sterna antellarum brownii*), American brown pelican (*Pelicanus occidentalis californicus*), and American peregrine falcon (*Falco peregrinus anatum*) In addition, seven state listed wildlife species, Mohave ground squirrel (*Spermophilus mohavensis*), Swainson's hawk (*Buteo swainsonii*), bank swallow (*Riparia riparia),* willow flycatcher (*Epidonax traillii*), California least tern (*Sterna antellarum brownie*), American brown pelican (*Pelicanus occidentalis californicus*), and American peregrine falcon (*Falco peregrinus anatum*), occur in the area. These species accounts were obtained from the CDFG.

3.4.2.2 Sensitive Habitats at Edwards AFB

Desert tortoise critical habitat is present within the ROI. Two sensitive ecological areas, as defined by the county of Los Angeles, occur within Edwards AFB: Piute Ponds and mesquite woodlands. Piute Ponds, in the southwestern corner of the base, supports a substantial number of waterfowl and provides a stopover area for migratory birds. Mesquite woodlands, in the south-central portion of Edwards AFB, provide a unique habitat for wildlife such as the phainopepla and loggerhead shrike.

Table 3-4

Sensitive Animal Species in the R-2515 and Edwards AFB

Common Name	Scientific Name	Status	Habitat/Feeding Habits	Range
Reptiles				
Desert tortoise	*Gopherus agassizii*	FT	Scrub	Mojave-Sonoran desert
Chuckwalla	*Sauromalus obesus*	FSC/CSC	Rock outcrops	California desert
Desert horned lizard	*Phrynosoma coronatum frontale*	CSC	Alluvial fans	California desert
Mojave fringe-toed lizard	*Uma scoparia*	CSC	Sand dunes, washes	Limited endemic
Mammals				
Mohave ground squirrel	*Spermophilus mohavensis*	FSC/ST	Scrub	Mojave desert
Pallid bat	*Antrozus pallidus*	CSC	Feeds throughout the base	North America
Pocketed free-tailed bat	*Nyctimops femerosaccus*	CSC	Feeds over water	Extreme SE California
Western mastiff bat	*Eumops perotis californicus*	FSC/CSC	Feed throughout the base	North America
Spotted bat	*Euderma maculatum*	CSC	Feeds over water	North America
Big Free-tailed bat	*Nyctimops macrotis*	CSC	Often feeds over water	North America
Townsends' big-eared bat	*Plecotus townsendii townsendii*	CSC	Often feeds over water	North America
American badger	*Taxus taxus*	CSC	Scrub	North America
Birds				
Cooper's hawk	*Accipiter cooperi*	CSC	Trees, housing	North America
Ferruginous hawk	*Buteo regalis*	FSC	Poles along roads	North America
Swainson's hawk	*Buteo swainsonii*	ST	Poles along roads	North America
Golden eagle	*Aquilia chrysaetos*	CSC	Poles along roads	North America
Northern harrier	*Circus cyaneus*	CSC	Basewide	North America
Prairie falcon	*Falco mexicanus*	CSC	Piute Ponds, adjacent scrub	North America
Short-eared owl	*Asio flammeus*	CSC	Piute ponds	No longer breeds in California
Long-eared owl	*Asio otus*	CSC	Mesquite woodland	Riparian woodlands North America
Burrowing owl	*Speotyto cunicularia hypugaea*	CSC	Scrub, basewide	Throughout California

Table 3-4, Page 1 of 3

Table 3-4 (Continued)

Sensitive Animal Species in the R-2515 and Edwards AFB

Common Name	Scientific Name	Status	Habitat/Feeding Habits	Range
Birds (Continued)				
Osprey	*Pandion haliaetus*	CSC	Hunts at ponds for fish	Large bodies of coastal water
Vaux's swift	*Chaetura vauxi*	CSC	Hunts insects in flight	Breeds along coastal California
LeConte's thrasher	*Toxostoma lecontei*	CSC	Hunts insects on ground	Central Valley-Desert
Loggerhead shrike	*Lanius ludovicianus*	FSC	Hunts insects-lizards	California lower elevations
Bank swallow	*Riparia riparia*	ST	Hunts insects in flight	California west of deserts
Yellow warbler	*Dendroica petechia*	CSC	Hunts insects on foliage	California, skips desert except riparian
Willow flycatcher	*Epidonax traillii*	SE	Hunts insects on foliage	Most of California except desert and NW
California gull	*Larus californicus*	CSC	Piute, main base, south base	Widespread, breeds at Mono Lake
Sharp-shinned hawk	*Accipiter striatus*	CSC	Piute, main base, south base	Found throughout California breed in the north
Western least bittern	*Ixobrychus exilis*	CSC	Hunts fish/amphibians in ponds	Central Valley-Salton Sea
White-faced ibis	*Pilegadis chihi*	CSC	Piute ponds	California, breeds in Central Valley and Salton Sea
Western snowy plover	*Charadrius alexandrinus nivosus*	CSC	Playa edges	Coastal California and brackish inland water
Gray vireo	*Vireo vicinior*	CSC	Hunts insects on foliage	Lower mountain slopes of California mountains
Common loon	*Gavia immer*	CSC	Hunt for fish	North America
American white pelican	*Pelecanus erythrorhynchos*	CSC	Hunts fish in ponds	North America
Fulvous whistling duck	*Dendrocygna bicolor*	CSC	Eat grain, rice in fields	Coastal California
Harris hawk	*Parabuteo unicinctus*	CSC	Rabbits and squirrels	Sonoran Desert

Table 3-4, Page 2 of 3

Table 3-4 (Continued)

Sensitive Animal Species in the R-2515 and Edwards AFB

Common Name	Scientific Name	Status	Habitat/Feeding Habits	Range
Birds (Continued)				
Double crested cormorant	*Phalacrocorax auritus*	CSC	Hunts on ponds	Coastal California and brackish inland water
Gull-billed tern	*Sterna nilotica vanrossemi*	CSC	Breeds at Salton Sea, Colorado River in California	Coastal California and brackish inland water
Purple martin	*Progne subis*	CSC	Hunts on the fly over base	Riparian woodlands of North America
Mountain plover	*Charadrius montanus*	CSC/FPFT	Eats ground insects	Prairie
Long-billed curlew	*Numenius americanus*	CSC	Invertebrates in salt flats	Prairie endemic
Tricolored blackbird	*Agelaius tricolor*	CSC	Insects and grain	Central valley
California least tern	*Sterna antellarum brownii*	ST/FE	Common in July	West coast of North America
Red-shouldered hawk	*Buteo lineatus*	CSC	Rodents and birds	California subspecies primarily the Central Coast
Yellow breasted chat	*Icteria virens auricollis*	CSC	Insects	Edges of woodlands
California Horned Lark	*Eremophilia alpestris*	CSC	Insects	Grasslands, desert edge
American Brown Pelican	*Pelicanus occidentalis californicus*	FE/SE	Fish	Coastal
American peregrine Falcon	*Falco peregrinus anatum*	FE/SE	Small birds	Statewide, nests coastal only

Table 3-4, Page 3 of 3

Notes: CSC – California species of Concern
FE – Federal Endangered
FP- Federal Protected
FT – Federal Threatened
FSC – Federal Species of Concern
SE – State Endangered
ST – State Threatened

3.5 NOISE

3.5.1 Existing Conditions in R-2508 Complex

The land under the R-2508 Complex consists primarily of open space, but includes industrial, residential, commercial, and public/recreation centers as well. Additional detailed information on existing conditions and noise contours is provided in Appendix D.1 and D.2.

Road noise within the R-2508 Complex varies from 60 to 90 A-weighted decibel (dBA) depending on the type and quantity of traffic.

The total noise contours include the effects of distributed aircraft operations and that of low level and other test routes that lie within the R-2508 Complex. The day-night sound levels on the A-weighted decibel scale (L_{dn}) noise contours resulting from subsonic aircraft operations range from 45 to 60 dBA (up to 65 dBA at Ft. Irwin) within the R-2508 Complex (95 ABW and AFFTC 2005c). The ambient noise levels around military airfields range from 45 dBA to 80 dBA, but these noise contours lie completely within the base boundaries.

3.5.2 Existing Conditions Restricted Area R-2515 and Edwards AFB

The L_{dn} noise contours resulting from subsonic aircraft operations in restricted area R-2515 range from 55 dB L_{dn} to less than 45 dB L_{dn} (95 ABW and AFFTC 2005a); therefore no noise above 60 dB L_{dn} would be expected in restricted area R-2515. The highest noise levels are found in the area of Cords Road, the Alpha Corridor, and the PIRA.

The noise levels near the residential areas and at the perimeter of the base remain below 65 dB Community Noise Equivalent Level (CNEL).

3.5.3 Noise From Sonic Booms

Aircraft traveling at or above sonic velocity produce sonic booms with a noise level of 61 dB L_{cdn} and below within restricted area R-2515 (95 ABW and AFFTC 2005a). It was estimated that approximately 740 supersonic flights were conducted within the Edwards AFB supersonic corridors in 1999. Overpressures for the majority of sonic booms run a nominal 1.3 pounds per square foot (psf) (AFFTC 2001).

3.6 INFRASTRUCTURE

Infrastructure refers to the physical components that are used to deliver something (e.g., electricity, and traffic) to the point of use. Elements of the base infrastructure system include water, wastewater, electricity, natural gas, communications lines (e.g., telephone and computer), and circulation systems (i.e., streets and railroads) that run in a network through the base.

3.6.1 Water, Wastewater, Electricity, Natural Gas, and Communications at Edwards AFB

Water resources describe the quality, quantity, source, and use of water. At Edwards AFB, water resources include drinking (potable) water, wastewater, and stormwater. The sources of water on Edwards AFB include groundwater, Antelope Valley-East Kern (AVEK) Water Agency water, treated wastewater (irrigation), and stormwater. Edwards AFB has various facilities dedicated to water resources. They include six chlorination points for drinking (potable) water, numerous potable and nonpotable water storage tanks, two operating wastewater treatment plants (Main Base and the AFRL with associated evaporation ponds), and stormwater retention ponds.

At Edwards AFB, utilities that may be encountered during digging and trenching operations at the project location could include water, electrical, communications, stormwater, and/or sanitary sewer systems. Water mains are typically transite TM (i.e., asbestos cement) pipe. Utility service lines are galvanized steel or copper pipe. Sewer lines are cast iron within the 5-foot line and under building slabs and are vitrified clay pipes beyond 5 feet from the buildings.

3.6.2 Water, Wastewater, Electricity, Natural Gas, and Communications in the R-2508 Complex

The R-2508 Complex has many bodies of water and dry lakes that are used for a variety of purposes, including recreational areas, water supply, and aircraft landing areas. The Los Angeles Aqueduct is located within the Complex boundaries and extends in a northerly direction from the southern boundary of the Isabella Area to the Hiawee Reservoir, located near the southern boundary of the Owens Area. Other major surface waters located in the Complex include the Tinemaha Reservoir, North and South Forks of the Kern River, Lake Isabella, Owens River, and Amorgosa River. Major playas located in the complex include Owens Lake, Rogers Dry Lake, Rosamond Dry Lake, Searles Lake, and China Lake.

Existing utility lines run in a network throughout the R-2508 Complex. A majority of the land beneath the R-2508 Complex airspace is managed by the Bureau of land Management (BLM). Public lands managed by the BLM often provide suitable locations for utility transmission lines. The California Desert Conservation Area Plan, as amended, provides specific corridors for the location of major transmission lines; these corridors were developed to concentrate the impacts of utility lines in manageable locations. Several of these corridors are located within the R-2508 Complex. These corridors may consist of electrical transmission towers and cables of 161 kilovolts (kV) or above; natural gas, water, or petroleum pipelines with diameters greater than 12 inches; coaxial cables for interstate communications; or aqueducts or canals for interbasin water transfer (BLM 1980).

Power plants, landfills, and communication sites are located throughout the Complex.

3.6.3 Traffic and Circulation

3.6.3.1 Base Access and Circulation

Access to Edwards AFB is by way of Rosamond Boulevard from the west or north, and by Lancaster Boulevard/120th Street East from the south. Primary access to Edwards AFB from the adjacent roadways is by way of three gates, each in operation 24 hours a day, 7 days a week. The gates are the North, West, and South Gates. All are improved with two inbound and two outbound lanes at each gate facility (AFFTC and U.S. Army Corps of Engineers 1994).

Internal circulation on the base is by way of paved and unpaved primary, secondary, and tertiary roads. Primary roads connect Edwards AFB components such as the flightline, Engineering and Administration, and support areas to entry points. Secondary roads connect Edwards AFB components to one another and support facilities such as commercial or housing areas. Tertiary roads are unpaved access roads or residential streets within the housing area. Lancaster and Rosamond Boulevards are the two primary roads on Main Base. These two primary roads form the spine of the base road system, providing high-speed, high-volume access to connecting secondary and arterial roads and activity centers on Main Base. Significant secondary roads are Fitzgerald Boulevard, Forbes Avenue, Yeager Boulevard, and Wolfe Avenue. Traffic comprises government, contractor, and personally owned vehicles (POV) belonging to those that live and/or work on-base. In addition, commercial vehicles deliver material to businesses and facilities in the area. Commercial and Air Force vehicles are used for service and construction work done in the area (e.g., repairs). Emergency vehicles require access to all buildings and roads.

In addition to the paved roadways, an extensive network of unimproved dirt roadways exists, essentially equivalent to the paved network. These roads have established posted speed limits and provide access to various installation facilities and sites. Two railroads are adjacent to the base. The Southern Pacific line runs parallel to the base's west boundary and adjacent to Sierra Highway. The north/south main line does not provide service to Edwards AFB. The Atchison, Topeka, and Santa Fe railroad is located south of California Highway 58 and along the northern boundary of the base. Two rail spurs, one at Edwards Station and the other at Boron Station, connect to the Main Base and AFRL, respectively (AFFTC 2001). The Main Base spur consists of approximately a half-mile of 110-pound rail and 12.5 miles of 90-pound rail extending from Edwards Station south along Rosamond Boulevard to the Main Base warehouse/supply area. Additional spurs from this warehouse lead spur serve the unconventional fuel storage area and the petroleum, oil, and lubricants (POL) storage areas. This government-owned spur is used approximately once every 3 months (AFFTC 2001).

3.6.3.2 Key Regional Roads

There are several major transportation routes located within the R-2508 Complex. The main corridor extends in a north-south direction and consists of State Highway 14 and U.S. Highway 395. U.S. Highway 395 traverses the entire length of the R-2508 Complex, connecting cities located at the southern boundary in the Mojave Desert to communities in the Owens Valley, and continuing to the Sierra Mountains located north of the R-2508 Complex. State Highway 14 extends from the City of Rosamond, located at the southern boundary of the R-2508 Complex, to the intersection of U.S. Highway 395 near the approximate center of the R-2508 Complex. The other major transportation route providing access in an east-west direction is State Highway 58. This highway connects the City of Bakersfield, located east of the R-2508 Complex, to Barstow, located near the southeastern corner of the R-2508 Complex. Other surface transportation routes include State Highways 155 and 178, which provide east-west access through the Isabella and Porterville Areas and State Highway 190, which also provides access in an east-west direction through the Owens, Panamint, and Saline Areas.

3.6.4 Facilities

Edwards Main Base includes the Dryden Flight Research Center at its north end and is directly connected to the South Base. The Main Base airfield has a control tower, a terminal radar approach control (TRACON), and Radar Control Facility. As a military airbase, civilian access is severely restricted, but is possible with prior coordination and good reason. There are two lighted, paved runways; 04/22 and

06/24. Most of the hangars, operations, administration, and support buildings are located adjacent to Rogers Dry Lakebed. The runways, taxiways, and aprons at Edwards AFB support 80 aircraft and 24 flights on a daily basis.

3.7 SAFETY AND OCCUPATIONAL HEALTH

Safety is defined as the protection of workers and the public from hazards. The total accident spectrum encompasses not only injury to personnel, but also damage or destruction of property or products. For worker safety, the boundary of the immediate work area defines the ROI. For public safety, a much larger area must be considered. This area varies depending upon the nature of the operation, but may extend for miles beyond the source of the hazard.

Potential health and safety issues within the R-2508 Complex, restricted area R-2515, and Edwards AFB, include radiological, biological, chemical, and physical hazards, as well as weapons, flight, ground, range, and test [systems] safety. Explosions, fires, and spills of propellants could also endanger workers; however the potential impact would generally be limited to the vicinity of the accident.

The DoD (including the Army, Air Force, and Navy) and NASA DFRC institutional safety programs are intended to minimize accidental injury, illness, and loss of property. The Safety Office at each range and base of operations is responsible for monitoring the safety programs through a system of inspections, surveys, audits, and follow-up investigations. Elements of the safety program include accident and injury prevention and reporting, fire prevention and protection, emergency preparedness, and hazardous material and waste management. Emergency Response Plans are in place to address emergencies such as earthquakes, aircraft accidents, fires and explosions, bomb threats, civil disturbances, nuclear emergencies, and toxic vapor releases or chemical spills.

Safety and occupational health in areas of the R-2508 Complex that are not on military installations is governed by California Occupational Safety and Health Administration and Public Safety Programs under the guidance of the California Division of Occupational Safety and Health or the Nevada Bureau of Health Protection Services.

The routine and recurring small transient and new missions addressed by this EA will primarily be supported, launched, and recovered from Edwards AFB; therefore flight safety at Edwards AFB is the focus of this section. As such, the majority of potential safety concerns would be assessed and mitigated by the 95 ABW, NASA DFRC, and AFFTC. The AFFTC's occupational health program is intended to

recognize, evaluate, and control workplace factors or stresses that may cause sickness, impaired health, or significant discomfort to employees. To protect AFFTC personnel from noise hazards, hearing protection is used if personnel are exposed to noise levels exceeding 85 dBA. The program identifies and quantifies worker exposure to hazardous chemicals, noise, and radiation. Through AFFTC's Hazardous Communication Program, employees are educated regarding proper chemical management principles and procedures.

3.7.1 Range Safety

The national range system, established by Public Law (P.L.) 81-60, was originally sited based on two primary concerns: location and public safety. Thus, range safety, in the context of national range activities, is rooted in P.L. 81-60 and Department of Defense Directive 3200.11, *Use Management*, and *Operation of Department of Defense Major Range and Test Facilities*; both provide the framework under which the national ranges operate and provide services to range users. To provide for the public safety, the ranges, using a Range Safety Program, ensure that the weapons delivery testing presents no greater risk to the general public than that imposed by overflight of conventional aircraft.

It is the policy of the Edwards AFB Range and the NASA DFRC Western Aeronautical Test Range to ensure that the risk to the public, military personnel, government civilian workforce, contractors, and to national resources is minimized to the greatest degree possible. This policy is implemented by using risk management in the areas of public safety, launch area safety, and landing area safety. Range users are required by Edwards AFB to demonstrate, through risk modeling, that the lowest possible risk is achieved, consistent with AFFTC mission requirements and risk guidance. The AFFTC Chief of Safety has responsibility for approving the proposed test plans and flight safety criteria. The AFFTC Commander has final authority and responsibility for the safety of the proposed action. The Range Commander may deviate from these mission criteria based on geography, weather, and national need; however, the basic standard is no more risk than that voluntarily accepted by the general public in normal day-to-day activities (NASA 1997).

Health and safety issues related to aircraft operations (both routine and emergency management) involving ground personnel working near operating aircraft during taxiing and inspection activities, aircrews using runways (lakebed and non-lakebed surfaces), and personnel present during emergency operations, aircraft malfunction, or other mishap are specifically addressed in AFFTCI 11-1, *Air Operations*, and AFFTCI 11-2, *Ground Operations*. These instructions address in-flight operations, flight

preparation, and ground procedures directly related to the safety of personnel on the ground, as well as emergency procedures for the protection of all personnel at Edwards AFB. A fundamental requirement of the Edwards AFB Flight Safety Program is that each unit conducting or supporting flight operations has a flight safety program as well as a Midair Collision Avoidance Program.

3.7.2 Exposure Hazards

Exposure hazards may include heat stress, venomous snakes, poisonous insects, hanta virus, and valley fever. Additional aircraft and weapon system hazards may include effects from non-ionizing electromagnetic radiation, lasers and high power microwave systems, and explosives and propellants.

3.7.2.1 Non-Ionizing Electromagnetic Radiation

Non-ionizing electromagnetic radiation (EMR) comes from two major sources: radio frequency emitters (i.e., radars, radar-jamming transmitters, and radio communication equipment), which are regulated by Air Force Occupational Safety and Health (AFOSH) Standard 48-9, *Radio Frequency Radiation (RFR) Safety Program*; and laser emitters, which are regulated by AFOSH Standard 48-139, *Laser Radiation Protection Program,* and DoD Instruction 6055.11, *Protection of DoD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers*. Sources of EMR exist throughout the flightline area and include fixed location radar, airfield management equipment, and aircraft equipment/instrumentation. Electromagnetic radiation can cause thermal and photochemical injuries to humans, particularly to the eyes and skin. Standards and practices are in place to shield and isolate workers from operational hazards of existing EMR sources.

Bioenvironmental Engineering periodically makes visits to and evaluates the operations of all known AFFTC industrial radiation users as a part of the Industrial Hygiene Surveillance Program. This office also verifies (annually) the list of radio frequency radiation emitters and low-powered laser systems used on Edwards AFB. Any proposed use of emitters is evaluated using a preliminary radiation and lasing hazard analysis. Using a permissible exposure limit (PEL) and maximum probable exposure, a proper hazard analysis is accomplished. The PEL and maximum exposure limit are expressed in terms of safe distance limits from the emitting source. Compliance with these limits is required as a standard operating procedure (95 ABW and AFFTC 2005a).

3.7.2.2 Lasers and High Power Microwaves

Lasers produce narrow beams of light that may or may not be in the range of light visible to humans. There are many laser-based systems used in Edwards AFB operations, most of which are used on aircraft during flight operations as target-range finders and target designators. Laser weapons are used for test and training activities at approved locations on Edwards AFB under scheduled and controlled conditions (i.e., Integrated Facility for Avionics Testing, Benefield Anechoic Facility) and as described in the *Environmental Assessment for Testing and Evaluation of Directed Energy Systems Using Laser Technology at Edwards AFB* (U.S. Air Force 2006a).

The use of high power microwave systems at Edwards AFB and within restricted area R-2515 is described in the *Environmental Assessment for the Integration and Developmental Testing of High Power Microwave Systems at Edwards AFB* (U.S. Air Force 2006b). These systems are tested under controlled conditions following stringent guidelines established to ensure the safety to personnel at Edwards AFB and the surrounding area, as well as non-participating resources, is enforced.

3.7.2.3 Explosives and Propellants

Explosives and propellants are used and stored in a number of locations throughout Edwards AFB. An inhabited building separation distance (or clear zone) has been established around each of the existing explosives and/or propellant use/storage locations. The size of the clear zone varies based on the quantity and type of explosive used or propellant stored there. Clear zones ensure the safety of all personnel in the area from the potential overpressure hazard associated with use and storage of these materials.

3.8 SOCIOECONOMICS

3.8.1 Population

The population in areas underneath the R-2508 Complex is sparse. According to the year 2000 census data, approximately one-third of the area underneath R-2508 Complex has a population density of fewer than 10 persons per square mile and the Complex has a total population of approximately 162,459. Of this population, 125,378 (77%) are identified as white; 7,989 (5%) are identified as black; 3,656 (2%) are identified as American Indian, Eskimo, or Aleut; 3,906 (2%) are identified as Asian or Pacific Islander; and 14,286 (9%) are identified as other races. Approximately 17 percent (27,615 people) of the total population identify themselves as being of Hispanic origin. Population centers in the R-2508 Complex

area are designated as either in incorporated cities or census designated places (CDPs). CDPs have a population of at least 1,000 people.

The population concentrations near Edwards AFB within the Isabella Area and R-2515 include the Rosamond CDP, Mojave CDP, Bear Valley Springs CDP, North Edwards CDP, Boron CDP, and Edwards AFB CDP and the cities of California City and Tehachapi. These communities had a total 2000 population of 50,920.

Many of the sparsely populated areas in the R-2508 Complex are part of national parks, national forests, or other recreation areas. Although these areas have very small permanent populations, visitor populations are larger seasonally. Approximately 19 million people visited recreation areas in the R-2508 Complex in 2000. The majority of the recreation visitation in Sequoia and Kings Canyon National Parks, Sequoia National Forest, and Inyo National Forest occurs in the summer months. In contrast, the largest visitor use of Death Valley National Park is in November, March, and April.

3.8.2 Employment and Income

In 2000, the most important job categories in the communities underlying the R-2508 Complex reflect the importance of government employment and tourism in the region. These categories include public administration, retail trade, manufacturing, entertainment, professional services, and educational, health and social services. The public administration job category represented approximately 17 percent of all jobs in incorporated areas while the retail trade employment category represents approximately 11 percent; the manufacturing employment category represents approximately 8 percent; the educational, health, and social services employment category represents approximately 17 percent; and professional services employment accounted for approximately 9 percent.

The three military installations in the R-2508 Complex have a significant contribution to the employment in nearby communities. In 2001, Edwards AFB, Naval Air Weapons Station China Lake, and Fort Irwin National Training Center employed approximately 9,300 military and 20,550 civilian personnel.

Edwards AFB makes a substantial contribution to the economic status of the surrounding communities within the Antelope Valley. For fiscal year (FY) 98, the estimated cumulative economic impact from Edwards AFB's annual operating expenditures including salaries, DoD acquisitions, and educational assistance in the surrounding communities was $1.3 billion (AFFTC 1998b).

Contributions to the local economy by flight test wings of greater than 100 persons assigned to Edwards AFB are estimated at $1.0 million. The gross income multiplier for Edwards AFB used to calculate off-Base economic activity for every dollar spent in the local economy is 4.2302 (AFFTC 1998c).

3.8.3 Housing

Base housing is available for officer and enlisted personnel. Available base housing includes 259 units for officers and 1,382 units for enlisted members (AFFTC 2003). All ranks may be housed subject to availability and in accordance with AFI 32-6001, *Family Housing Management*. Currently, the vacancy rate for housing has remained stable at 10 percent (AFFTC 2003). Unaccompanied enlisted members are housed in dormitories. Edwards AFB has two- and three-story dormitories, each housing from 32 to 84 members in single and double rooms. A new complex with single rooms sharing a kitchenette and bath has recently opened. Bachelor officer housing consists of 62 apartment-style units, with 16 apartment-style units available for senior noncommissioned officers. Transient quarters are available through the Billeting Office.

Additional civilian/contractor personnel who would arrive on-base with the flight test programs would have a variety of affordable housing options within a 35- to 45-mile radius of the base in Rosamond, California City, Palmdale, and Lancaster.

3.8.4 Schools

Over 135 schools are within 50 miles of the base. These schools had a total 2006–2007 enrollment of 98,999. Table 3-5 shows the distribution and enrollments for schools in the local area that could gain students if the Proposed Action was implemented. Schools are considered sensitive noise receptors. In general, schools in the R-2508 Complex are located in communities which have a minimum altitude requirement for overflights of at least 3,000 feet AGL, except in emergency conditions. The Edwards Child Development Center is available for families with preschool children age 6 weeks to 4 years old. The Center accommodates about 300 children on an annual basis. Children aged 5 to 12 years who require before and after school activities have access to the Edwards Youth Center. The Youth Center can accommodate over 350 children on a daily basis. Children aged 13 to 18 years have access to the Edwards Teen Center. Daily attendance at the Edwards Teen Center ranges from 60 to 70 on a daily basis.

Table 3-5

Schools in the Local Area

City	Type of School	Quantity	Enrollment
Boron	Public	2	617
Cantil	Public	2	13
California City	Public/Private	4	1,458
Edwards	Public	4	1,528
Lancaster	Public/Private	57	38,057
Mojave	Public	5	1,603
Palmdale	Public/Private	48	41,765
Rosamond	Public/Private	8	3,477
Tehachapi	Public	6	5,016
Quartz Hill	Public	3	5,465
Totals		139	98,999

Source: Greatschools.net 2007

The base also provides Family Child Care Programs from Air Force accredited, licensed homes. The Program offers activities and experiences within a home environment for the childhood development of socialization skills in preparation for school. Currently, there are about 30 licensed homes on-base that are in the program.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter addresses the impacts associated with consolidating operational test missions at Edwards AFB and discusses the potential environmental consequences or impacts associated with Alternatives A, B, C, and D. Changes to the natural and human environment that could result from implementing Alternatives A, B, C, and D were evaluated relative to the existing environmental conditions. Specific projects and test missions may have actions not covered in this EA. Different aircraft would present some variation in the consequences; however, by implementing mitigation measures and best management practices, the 95th ABW and AFFTC would ensure any potential environmental consequences would be less than significant. Any mission consolidation issues not analyzed in this document would remain the responsibility of the proponent test program office and would be addressed when they are ripe for decision.

4.1 AIR QUALITY

The primary impacts to air quality from the Proposed Action would come from emissions from the various aircraft, support equipment, and vehicles traveling to the base and the local area. The maximum predicted air emissions by aircraft type are listed by pollutant in Table 4-1. In all cases the emission levels would be below *de minimis* levels established by regulation.

Table 4-1

Projected Aircraft Emissions per Year for Various Aircraft

Number of Flights	Aircraft Type	NO_x	VOCs	PM_{10}
400	A-10	0.3	2.7	0.00
150	F-15	2.8	0.5	0.08
1,200	F-16	11.2	1.9	0.31
250	F-22	4.7	0.8	0.13
Total		19.1	5.8	0.52
Regulatory Limits		50[b]	50[b]	70[a]

Notes: a Conformity *de minimis* level for PM_{10} in MDAQMD/AVAQMD/SJVAPCD/GBUAPCD is shown based on the lowest level in the ROI.

b In accordance with the air conformity requirements of 40 CFR 51.853193.153 (b)(l) and KCAPCD Rule 210.7, the *de minimis* levels set for the ozone *Serious* non-attainment area of KCAPCD for ozone precursor emission is up to 50 tons per ozone precursor pollutant (NO_x and VOC) per year per action.

AVAQMD Antelope Valley Air Quality Management District
GBUAPCD Great Basin Unified Air Pollution Control District
MDAQMD Mojave Desert Air Quality Management District
NO_x nitrogen oxides
N/A not applicable
PM_{10} particulate matter less than 10 microns in diameter
SJVAPCD San Joaquin Valley Air Pollution Control District
VOC volatile organic compound

The projections in Table 4-1 indicate the ozone precursor emissions (NO_2 and volatile organic compounds [VOCs]) for any aircraft type would be below the regulatory thresholds. The majority of emissions by aircraft would be associated with takeoff and landing at Edwards AFB in that portion of the base that is in the MDAB portion of Kern County. These emissions would be below *de minimis* thresholds. In addition, the emissions of ozone precursors would less than 0.005 percent of the total Kern County (40 CFR Part 93 Subpart 153[i]) inventory.

4.1.1 Data, Assumptions, and Models Used in the Analysis

Potential air quality impacts would be attributed to emissions from aircraft, vehicles, and support equipment directly related to the Proposed Action and Alternatives. The routine, recurring transportation of personnel and the future activities conducted would be similar in scope to those activities conducted in previous years. Although the level of activity for the Proposed Action and Alternatives would be greater than the past 3–5 years, it would still be well below the activity level of the late 1990s. These actions would result in emissions that are below the *de minimis* threshold levels established by federal and state regulations. New construction would cause a temporary increase in air emissions as addressed in the *Programmatic Environmental Assessment for Small Building Construction, Relocation, and Modification at Edwards AFB, California*, December 1998; *Environmental Assessment for the Construction of the Information Technology Center, Edwards AFB, California*, March 2001; and *Environmental Assessment for the Construction of Phase II of the Dormitory Project*, December 2002.

Emissions from test aircraft were assumed to be from the A-10, F-15, F-16, and F-22 (Appendix A). These were selected as the most likely aircraft for the Proposed Action. Even if other aircraft types would be used, emissions for the same number of flights would be similar. The number of operations for each aircraft is based on a 20 percent increase in number of operational flights at Edwards AFB. Typical test missions are anticipated to last up to 2 hours with approximately 5 percent of that time spent below 3,000 feet AGL. Emissions from aircraft landing, takeoff, and touch-and-go operations were calculated using engine emission factors specific to the aircraft engine and engine-operating mode (Air Force Institute for Environmental, Safety and Occupational Health Risk Analysis [AFIERA] 2002).

The AGE/ground support equipment (GSE) emissions were calculated using emission factors obtained from *AP-42: Compilation of Emission Air Pollutant Factors* (AFIERA 2002; U.S. EPA 2000). AGE emissions were calculated based on the number of missions per year, phase of each mission, and the type of aircraft being supported. The GSE emission calculations were performed utilizing duration of activity or miles driven and vehicle engine emissions for the given size ground transport vehicles.

Table 4-2

Projected Aerospace Ground Equipment Emissions per Year

		Emissions (tons/year)		
Types of Units	**Hours Used**	**NO_x**	**VOCs**	**PM**
Air Conditioner, Tow Tractor, Air Start Cart, Generator Set, Hydraulic Test Stand, and Light Cart	8,584	4.20	1.78	0.61
Regulatory Limits		50[b]	50[b]	N/A

Note: See Notes on Table 4-1.

Air emissions would be generated by the privately owned vehicles of 1,500 military personnel and civilians as they travel from off- and on-base locations to their work sites. Emissions from vehicles in Kern County driven by dependents would also be counted when determining if the threshold *de minimis* values are exceeded. It was assumed that each family living off-base in Kern County has an additional vehicle and that, on average each, vehicle is driven 29 miles each day. Table 4-3 shows the projected emissions that would occur within the KCAPCD. Supplemental information describing how these calculations were derived is shown in Appendix A.

Table 4-3

Projected Vehicle Emissions per Year

		Emissions (tons/year)		
Type of Vehicle	**Miles Driven**	**NO_x**	**VOCs**	**PM**
POV	15,080,712	7.93	10.11	1.88
GOV	360,000	0.21	0.20	0.04
Total		8.14	10.31	1.92
Regulatory Limits		50[b]	50[b]	N/A

Note: See Notes on Table 4-1.

The total project NO_x and VOC emissions for the non-construction portion of the Proposed Action is below the *de minimis* levels for KCAPCD. The emissions are projected at 31.45 tons per year of nitrogen oxides, 17.89 tons per year of volatile organic compounds, and 3.06 tons per year of particulate matter; all values are below *de minimis* thresholds and would be considered less than significant.

Greenhouse Gas Emissions

Greenhouse gas emissions can remain in the atmosphere for decades to centuries, becoming well mixed, and the total impact of these emissions on the climate will be the same irrespective of the point of origin.

The U.S. Congress and the United Nations have formed committees to address these issues and to evaluate the effect of worldwide greenhouse gas emissions from human activities, and to address their reduction.

The aviation sector currently is the source of about 2.6 percent of the greenhouse gas emissions in the United States, with the United States military contributing only a small portion. Military aviation used approximately 0.5 percent of the United States aviation fuel in 2000. Non-aviation transportation emits 25 percent, industry 41 percent, and other United States sources emit 31 percent of the greenhouse gases (U.S. EPA 2006).

Technological and scientific research to reduce the impact of aviation on the global atmosphere is important since there is currently no economically feasible alternative to the kerosene-based jet fuel used by aircraft (United States Government Accountability Office [GAO] 2000). Funding for such research is limited. Most research and funding are being concentrated on the energy and non-aviation transportation sectors, where the majority of emissions are being generated.

Improvements in aircraft engines (i.e., reductions in weight, application of new technologies) are expected to significantly improve fuel efficiency, but there are trade-offs between applying these new engine technologies and ensuring safety and performance (GAO 2000). Technological and operational improvements in emissions from military aircraft have been more challenging to achieve because of the mission/performance requirements for these vehicles (Waitz *et al.* 2004).

Quantities of nitrous oxide and methane emissions from aviation activities are unknown because there is little knowledge of the magnitude of emission factors; however, these emissions contribute minimally to the national totals (Rypdal 2000).

Emissions of water vapor are quickly removed in the troposphere by precipitation. However, in the lower stratosphere, water vapor emissions can build up and lead to higher concentrations that are predicted to warm the earth's surface. Increases in cirrus cloud cover have been positively correlated with aircraft emissions in a limited number of studies (GAO 2000). The Air Transport Association of America, Inc. states that the mechanisms associated with increases in cirrus cloud cover are not well understood and need further investigation. According to NASA, which is studying the formation of contrail-induced cirrus clouds, the effect of clouds on the global climate is one of the biggest uncertainties in climate science today (GAO 2000). Little impact from contrail formation would be expected from the Proposed Action because the vast majority of flying would be at the mid-altitude range where contrails are seldom formed due to the warmer atmospheric temperatures in these altitudes.

The true magnitude of environmental impact on greenhouse gases resulting from the new mission test flights is unknown. However, in comparison to the overall contribution to greenhouse gases, the emissions from a relatively few number of flights, compared to the multi-million tons of emissions from hundreds of thousands of commercials flights operating in the lower stratosphere, would be less than significant. Consequently, although these flights would contribute to the overall total, the addition of gases from these new mission flights would be less than significant.

4.1.2 Alternatives Considered

The primary area that would be affected by the emissions shown in Tables 4-1 to 4-3 is the immediate area around Edwards AFB, situated in the MDAB portion of Kern County. The western Valley portion of Kern County, situated in the SJVAPCD, would not be affected by the proposed project because the aircraft would be well above 3,000 feet AGL in these areas and the area is separated by the mountain ranges to the north and west of the base.

4.1.2.1 Alternative A

Under Alternative A, emissions from flight operations would occur in the R-2508 Complex, including restricted area R-2515 and on and over Edwards AFB; however, these emissions would be below *de minimis* levels. Major MILCON under Alternative A would include construction of facilities similar to those listed in Table 4-4 that were proposed for Nellis AFB, Nevada (Air Combat Command and Nellis Air Force Base 2007).

Table 4-4

MILCON Construction Activities Under Alternative A

FY	Construction	Square Feet	Total Disturbed Area
08	Squadron Operations	13,740	187,300
08	Aircraft Maintenance Hangar	17,370	196,000
08	Hangar	23,940	47,880
08	Fuel Cell hangar	18,200	36,400
08	Armament	19,000	88,000
08	Sound Suppressor	4,000	N/A
08	Flight Simulator	16,000	174,150
08	Wing HQ Facility	8,000	16,000
08	Parking Pavement	30,000	N/A
08	Building Demolition	8,643	N/A
08	**Total**	**158,893**	**754,530**

Table 4-4, Page 1 of 2

Table 4-4 (Continued)

MILCON Construction Activities Under Alternative A

FY	Construction		Square Feet	Total Disturbed Area
09	AGE Complex		6,900	13,800
09	Engine Shop		9,000	18,000
09		**Total**	**15,900**	**31,000**
10	Ramp		375,000	375,000
10		**Total**	**375,000**	**375,000**

Table 4-4, Page 2 of 2

Emissions from construction activities shown in Table 4-4 are summarized in Table 4-5. When combined with the project emissions from mission aircraft, AGE, GSE, and POV travel, the totals would be still below *de minimis* values for Kern County.

Table 4-5

Projected Air Emission Summaries for FY08–FY10 (tons/year)

Fiscal Year	Emission Source	CO	NO_x	SO_x	VOCs	PM_{10}	$PM_{2.5}$
FY08	Construction	1.90	3.00	0.30	0.40	27.00	2.90
FY08	AGE	1.61	0.78	0.06	0.10	0.04	
FY08	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		**7.07**	**4.16**	**0.36**	**0.88**	**27.06**	**2.90**
FY09	Construction	0.30	0.60	0.10	0.10	0.80	0.10
FY09	AGE	1.61	0.78	0.06	0.10	0.04	
FY09	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		**5.47**	**1.76**	**0.16**	**0.58**	**0.86**	**0.10**
FY10	Construction	1.70	3.60	0.40	0.40	11.10	1.30
FY10	AGE	1.61	0.78	0.06	0.10	0.04	
FY10	Commuting	3.55	0.38	0.00	0.38	0.02	
Total		**6.87**	**4.76**	**0.46**	**0.88**	**11.16**	**1.30**
De minimis threshold (tons/year)		100	50[b]	N/A	50[b]	70[a]	N/A
Percent of Regional Contribution[c]		NA	0.047	N/A	0.020	0.24	N/A

Table 4-5 (Continued)

Projected Air Emission Summaries for FY08–FY10 (tons/year)

Notes:
a Conformity *de minimis* level for PM_{10} for MDAQMD/AVAQMD/SJVAPCD/GBUAPCD (only the lowest threshold value is shown).
b In accordance with the air conformity requirements of 40 CFR 51.853193.153 (b)(l) and KCAPCD Rule 210.7, the *de minimis* levels set for the ozone *Serious* non-attainment area of KCAPCD for ozone precursor emission is up to 50 tons per ozone precursor pollutant (NOx and VOC) per year per action.
c Percentage is based on the lowest value for KCAPCD and AVAQMD.

AVAQMD	Antelope Valley Air Quality Management District
CO	carbon monoxide
GBUAPCD	Great Basin Unified Air Pollution Control District
KCAPCD	Kern County Air Pollution Control District
MDAQMD	Mojave Desert Air Quality Management District
NOx	nitrogen oxides
N/A	not applicable
PM_{10}	particulate matter less than 10 microns in diameter
SJVAPCD	San Joaquin Valley Air Pollution Control District
VOC	volatile organic compound

4.1.2.2 Alternatives B and C

Air emissions from flight operations and commuters under Alternatives B and C would be the same as for Alternative A. The difference in air emissions for Alternatives B and C would be determined by the amount of construction activity. Minor military construction would occur under Alternative B, and no new construction would occur under Alternative C. Minor military construction could include construction of some of the facilities shown in Table 4-4. Since the emissions for the major construction would not exceed threshold values, it can be assumed that emissions from minor military construction would not create any significant impacts on the environment. In accordance with the air conformity requirements of 40 CFR 51.853193.153 (b)(l) and KCAPCD Rule 210.7, the *de minimis* levels set for the ozone *Serious* non-attainment area of KCAPCD for ozone precursor emission is up to 50 tons per ozone precursor pollutant (NO_x and VOCs) per year per action. While these activities would cause a temporary spike in air emissions, these values would still be well below *de minimis* thresholds and therefore, no significant impacts would be anticipated.

Based on the conformity applicability screening analysis presented in Section 4.1 and Appendix A, air emissions created by the proposed flight operations and construction activities would be below *de minimis* levels for criteria pollutants; therefore, air impacts resulting from implementing Alternatives A, B, or C would also be less than significant.

4.1.2.3 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. A consolidation of test missions would not occur at Edwards AFB. Other planned test missions would continue to occur and those mission aircraft would comply with approved flight profiles per applicable DoD, Air Force, and AFFTC instructions.

Based on the conformity applicability criteria, the proposed project would conform to the most recent U.S. EPA-approved State Implementation Plan, and no further detailed conformity applicability screening analysis is required.

4.1.3 Significance/Mitigation Measures

No significant effects or measurable impacts on air quality were identified. Because the projected emissions for all of the Alternatives considered would be below *de minimis* levels, and there would be no new or unique emissions or local issues, no mitigation measures are proposed.

4.2 AIRSPACE MANAGEMENT AND AIR SAFETY

The primary impact on airspace management and air safety for the Proposed Action and Alternatives would result from additional flight operations in the R-2508 Complex and the FAA-controlled NAS. Adding up to 2,000 annual sorties to the 34,000 sorties that occurred in 2005 would still be well below the 70,000 to 90,000 sorties that occurred during the late 1980s and 1990s. Potential air safety impacts, as with the operation of any aircraft, would be related to the ability of the pilot to see and avoid other aircraft and the ability to deal with contingencies without creating additional risks to people or property.

The projected number of military flight operations—when compared to the level of flight activity in the R-2508 Complex—represents a 5.9 percent increase in flight operations over 2005 flight activity, although the increase would still be 55 percent below the flight activity of the 1980s and 40 percent below the level of flight activity in the 1990s.

Because these new test missions would likely replace some of the current programs, the actual increase would be expected to be even smaller.

In 2004 the Los Angeles Center Air Route Traffic Control Center which oversees the airspace over Edwards AFB and the R-2508 Complex, handled over 2.1 million aircraft including over 163,000 military aircraft. Only approximately 5 percent of the total 2,000 proposed annual flights would occur in airspace

outside the R-2508 Complex. This would be only 100 flights added to the large number already managed by the FAA, and thus would not be significant.

4.2.1 Data, Assumptions, and Models Used in the Analysis

Airspace management and air safety are central issues that must be evaluated to determine potential impacts on other aircraft flying in the R-2508 Complex. Airspace would be affected or impacted if any of the following occurred:

- Movement of other air traffic (civilian or commercial) in the area was restricted;
- Conflict with air traffic control in the region (e.g., see and avoid or communications) occurred; or
- There was a change in operation or designation of airspace used for other purposes (e.g., conflict with operations within the military operations areas (MOAs), restricted areas, and other SUA).

Potential exists for conflict between civil and military aircraft. The management of military flight operations in the R-2508 Complex is governed by regulations which are explained in detail in AFFTCI-11-1, Aircrew Operations and the *R-2508 Complex User's Handbook* which can be found online at http://r2508.edwards.af.mil/Downloads/index.html.

4.2.1.1 Operations in Restricted Areas or Warning Areas

When a restricted or warning area is active under a particular controlling agency, only aircraft permitted by that agency may enter the airspace. When operating within a restricted or warning area, a test aircraft would be separated from any non-participating aircraft. The operating procedures for aircraft operating within the R-2515 and R-2508 Complex are identified in the R-2508 Complex Users Handbook. (Edwards AFB 2007).

4.2.2 Alternatives Considered

4.2.2.1 Alternatives A, B, and C

Impacts on the airspace resulting from consolidated test flight operations within the R-2508 Complex and restricted area R-2515 would be less than significant. Military flight operations are a normal occurrence in the R-2508 Complex. Procedures and requirements for operating in this airspace would fall inside the scope of normal activities within restricted airspace that may be designated as exclusive use airspace

during the specific flight operation. The potential for conflicts with other aircraft within restricted area R-2515 would be less than significant because operations within this airspace are scheduled and closely controlled. Aircraft that are not scheduled for or authorized to use the airspace cannot enter restricted airspace. Specific guidelines for test flight operations are addressed in AFFTC Instruction 11-1, *Flying Operations.* Flights operating outside of the R-2508 Complex would be required to comply with these requirements plus any FAA requirements. Ongoing coordination between the FAA and Air Force, which occurs on a routine and recurring basis, would still be required.

Test flights transiting from Edwards AFB (outside of the R-2508 Complex) would obtain an FAA flight clearance. Figure 4-1 shows the recommended entry and exit points for aircraft leaving the R-2508 Complex. Aircraft flights originating from Edwards AFB would use these typical entry and exit points unless specific mission requirements dictated otherwise or the FAA approved alternate entry and exit points determined on a case-by-case basis. No impacts would be expected from these activities because of their minimal number and they would operate according to FAA rules.

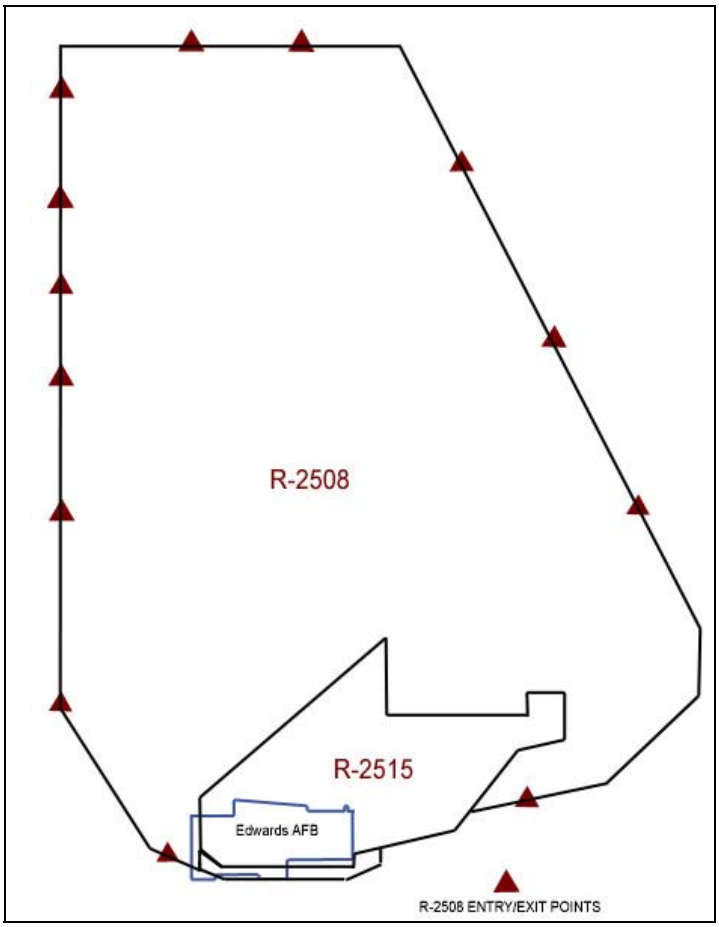


Figure 4-1 R-2508 Entry and Exit Points

The level of air safety can be measured by the various Class A mishap rates. The projected mishap safety rates are based on the number of mishaps per 100,000 flying hours. Table 4-6 shows the projected mishap rates for various aircraft that would be similar to consolidated test mission aircraft. Because the test pilots supporting these test missions are selected for their experience and expertise, the mishap rate at Edwards AFB would be expected to be below the average mishap rates shown in Table 4-6. Considering the training and strict adherence to procedures and regulations by these test pilots, one could reasonable assume the impacts on air safety would be less than significant

Table 4-6

Projected Class A Mishap Rates

Aircraft	Mishap Rate (per 100,000 flying hours)
A-10	2.35
F-15	2.07
F-16	3.60
F-22	N/A

Notes: F-22 has not yet flown 100,000 hours.
Source: Air Force Safety Center 2003, 2006

4.2.2.2 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Mission aircraft would comply with approved flight profiles per applicable DoD, Air Force, and AFFTC instructions. There would be no additional impacts on airspace management or air safety resulting from the No-Action Alternative.

4.2.3 Significance/Mitigation Measures

No significant effects on airspace management or air safety were identified by the analysis. Flight tests operating in the R-2508 Complex (including restricted area R-2515) and transitioning outside of the R-2508 Complex would be accomplished in accordance with strict guidelines promulgated by both the Air Force and FAA. By following Air Force and FAA guidelines, which include training requirements for pilots, the impacts on airspace management and air safety for aircraft flight operations would be less than significant and no mitigation would be required. The Air Force and NASA would continue to conduct operations in accordance with best management practices.

4.3 HAZARDOUS MATERIALS/HAZARDOUS WASTE/SOLID WASTE

Impacts on hazardous waste/hazardous materials and solid waste resulting flight operations would come from the maintenance, servicing, and operation of the aircraft and support equipment. The weight of the hazardous waste generated by an additional 25 aircraft, when compared to the quantity of hazardous waste generated annually at Edwards AFB, would be small. For example, the quantity of hazardous waste generated by the Global Hawk unmanned aerial vehicle (UAV) and F-22 aircraft range from approximately 7,320 pounds to 61,000 pounds per year for 25 aircraft and 2,000 flight operations. Assuming that the quantity of hazardous waste would be similar or in this range, then the total annual increase of hazardous waste would be between 0.7 and 6.1 percent; consequently, one could assume the impacts on hazardous waste resulting from new or transient test flight operations would be less than significant.

4.3.1 Data and Assumptions Used in the Analysis

The types hazardous materials required for any consolidated flight operations would be the same as for other aircraft: jet propellant-8 (JP-8) and other petroleum, oils, and lubricants. Management of materials associated aircraft launches, recoveries, and servicing are governed by Air Force instructions. When an aircraft is on the runway or flightline at Edwards AFB, hazardous materials and hazardous waste are managed per the requirements of the AFFTC *Hazardous Waste Management Plan* and NASA *DFRC Centerwide Procedure, DCP-S-102 Environmental Management System, Chemical Management.* If a spill occurred, the hazardous waste would be cleaned up in accordance with the AFFTC SPR Plan 32-4002, *AFFTC Oil and Hazardous Substance Spill Prevention and Response Plan*.

Hazardous waste generated by maintenance activities would include small quantities of fuel- and/or solvent-laden rags/absorbent, and used oil and hydraulic fluid. While used oil is not an EPA-classified hazardous waste, it is considered a hazardous waste in California. In 2006 Edwards AFB generated over 1,008,238 pounds of hazardous waste (Solis 2007).

Specific hazardous waste generation rates for all of the potential types of aircraft is not listed; however, data on hazardous material used would be expected to be the same or similar to the quantities of hazardous materials and minimal quantities of hazardous waste that are generated by Global Hawk UAV and F-22 aircraft currently operating at Edwards AFB. In 2006, five F-22 aircraft generated approximately 12,321 pounds of hazardous waste (Solis 2007). Assuming each F-22 aircraft generated 2,464 pounds of hazardous waste in 2006, then one could estimate that 61,600 pounds would be generated

by 25 F-22 aircraft. The predicted weight shown in Table 4-7 indicates that there would be an increase of approximately 6.1 percent during any year. While the generation rates may not be exactly the same for the other aircraft, one could expect the rates to be similar for jet aircraft with two engines.

Table 4-7

Annual Weight/Percent of Hazardous Waste Generated by Edwards AFB

Year	Number Aircraft	Hazardous Waste Generated (pounds)	Percent of Total Hazardous Waste
2008	25	61,600	6.1

Note: Weight of hazardous waste generated is based on an average of 2,464 pounds generated per aircraft (Solis 2007).

For other types of aircraft, such as the unmanned Global Hawk (*Global Hawk Main Operating Base Beddown Environmental Assessment* [U.S. Air Force 2001]) an estimated 3.66 pounds of hazardous waste would be generated per sortie (flight operation). Assuming that operating other aircraft similar in size would generate similar quantities of hazardous waste, it is estimated that 7,320 pounds of hazardous waste, an increase of 0.7 percent would be generated each year based on an additional 2,000 sorties operating from Edwards AFB.

The weight range of hazardous waste generated by these new test mission aircraft would be expected to be similar to the generation rates for the F-22 and Global Hawk. Consequently, the actual generation rates would be expected to be between 0.7 and 6.1 percent of the total hazardous waste generated on base; a less than significant value.

The U.S. EPA estimates that 3.09 pounds of solid waste are generated per person per day (U.S. EPA 2005). New test mission personnel would include 375 military and 1,125 civilian contractors. Of the 375 new military positions, 251 are estimated to be families that would add a total of 452 dependents (total of 703 people) (based on an average of 1.8 dependents per military family [Air Force Center for Environmental Excellence 2001]). According to historical data, 61 percent of the military families live on base; therefore 429 military members and their dependents would live on base. The remaining 124 military personnel would live in the dormitories. Consequently, 553 military members and their family members would generate 312 tons of solid waste per year that would be disposed of at the base landfill. The number of military personnel and dependents living on base would be constant because the number of housing units and dormitory space is limited and occupancy rates are constant. Consequently, these new personnel would replace military personnel and dependent that currently occupy base housing and the waste they generate would remain the same as for the personnel they replaced in base housing and

dormitories. Although 1,125 civilians would be added to the on base workforce, the majority of the solid waste they and their families would generate would be disposed of off base. The current landfill capacity at Edwards AFB is based on a disposal rate of 9,929 tons per year; the landfill is expected to be at capacity in 2024. The 312 tons per year of solid waste would not create any additional impact on the lifespan of the landfill.

Based on historical data, approximately 3,853 of the new personnel would live off base (Hagenauer 2007). Approximately 46 percent (1,772 people) would live in Kern County, 45 percent (1,734 people) in Los Angeles County, and 9 percent (347 people) in San Bernardino County. Altogether, they would generate an additional 2,172 tons of solid waste annually that would be collected by the local waste management agencies. Since the population in Kern County is expected to be to increase by 3.1 percent annually, an increase of 1,772 people would be less than 0.5 percent of the expected annual growth. One would assume the solid waste generated would be within the capacity of the local waste management agencies to collect and dispose of.

4.3.2 Alternatives Considered

4.3.2.1 Alternatives A, B, and C

The accumulation of hazardous materials and hazardous waste would normally be associated with the maintenance, servicing, and operation of aircraft and support equipment (AGE) at Edwards AFB, not in the airspace or land areas associated with restricted area R-2515 and the R-2508 Complex. Significant quantities of hazardous materials and hazardous/solid waste would not be anticipated to be generated in these areas as a result of the Proposed Action or Alternatives. Since flight operations would originate at Edwards AFB, the use of any hazardous materials and generation of any hazardous waste would be the same regardless of which alternative was selected. It could be assumed there would be an annual increase in hazardous waste generated by up to 6.1 percent because of the additional new mission flight tests. The amount of waste generated by these additional aircraft during routine and recurring flight operations would be well within the capability of the base to manage under the guidance of the hazardous materials and hazardous waste management plans. Consequently, no additional impacts on hazardous waste would result and no significant impact on hazardous materials or hazardous waste would be anticipated as a result of implementing Alternatives A, B, or C.

The solid waste generated by the new personnel would not create any additional measurable impact on the landfill at Edwards AFB; consequently, no long-term impacts on solid waste would be expected to occur as a result of implementing the Proposed Action or any of the Alternatives.

4.3.2.2 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Hazardous materials and hazardous waste generated by current flight test programs have been assessed to create no significant impact (U.S. Air Force 2001a). Hazardous materials used and hazardous waste generated as a result of these operations would be managed per applicable DoD, Air Force, and AFFTC instructions. There would be no unanticipated impacts on hazardous materials, hazardous waste, or solid waste resulting from the No-Action Alternative.

4.3.3 Significance/Mitigation Measures

No significant effects on hazardous waste or solid waste were identified by the analysis. Edwards AFB generates over 1,008,238 pounds of hazardous waste annually (Solis 2007) and is classified as a large quantity hazardous waste generator. An increase of approximately 6.1 percent would not change the hazardous waste generator status of the base. The small quantities of wastes expected to be generated by the Proposed Action or Alternatives could easily be assimilated and managed by current management practices. Since the types of hazardous wastes would not be new, would not change the generator status, would be the same as for other programs, and could be managed by current practices, it could reasonably be concluded that an increase of up to 6.1 percent created by additional flight operations would be less than significant and no mitigation measures would be planned or required. Edwards AFB would continue to implement standardized hazardous waste/hazardous material/solid waste management procedures and best management practices associated with use and disposal of hazardous materials/hazardous waste and solid waste.

4.4 NATURAL RESOURCES

Potential impacts on natural resources would be attributed to effects from direct or indirect contact with aircraft, program personnel, support equipment, or the testing of associated weapon systems. Flight-related activities would use existing runways, previously disturbed areas, roadways, and targets already approved for similar types of operations. The U.S. EPA has identified the criteria used to analyze all aspects of the natural environment. A description of these criteria is in Appendix C. The criteria focus on ecological and evolutionary processes, such as natural disturbance regimes, hydrological processes, nutrient cycles, and biotic interactions. As a practical matter the guidance suggests that [environmental] assessments should focus on ecological processes and how they can be affected by various stressors (U.S.

EPA 1999a). Examples of stressors could include human presence, litter, sewage, physical disturbance (trampling and erosion), removal of things, the introduction of exotic species, and water use.

Additional new mission test flights would be similar to current aircraft operations which are governed, regulated, and managed to prevent and/or minimize any impacts on natural resources. Flight test aircraft are part of the existing routine and recurring flight operations at Edwards AFB and throughout the R-2508 Complex. Support equipment would be operated from designated areas such as the aircraft hangars, aprons, dry lakebeds, existing roads, and previously disturbed areas on Edwards AFB. Program personnel would continue to follow the guidelines promulgated by the 95th ABW and the 412th Test Wing to ensure that impacts on natural resources are minimized and remain less than significant.

The testing of specific weapon systems is not platform-specific and would be governed by the environmental documentation for that system. An environmental review of the weapon system impacts would be completed prior to testing it with any of the new mission test aircraft. Consequently, flight test activities would not increase impacts on plants, wildlife, or habitat in this ROI as addressed by this programmatic assessment.

4.4.1 Data, Facts, and Assumptions Used in the Analysis

Facts used in the analysis conclude that

- Construction activities would occur in areas that do not provide habitat for threatened, endangered, or species of special concern;
- Existing facilities and disturbed areas would be used to the maximum extent possible; and
- Any new construction site would require coordination with cultural and biological resources to ensure sensitive sites are not disturbed.

The launch and recovery of test aircraft would occur on established runways or dry lakebed runways that are used for that specific purpose, launching aircraft. The testing of any weapon system (whether it used kinetic energy [e.g., bombs, rockets, or missiles] or non-ionizing radiation [e.g., lasers or high power microwaves]) would be limited to existing targets specifically designated for the type of weapon system being tested. Typically, target sites are devoid of vegetation and habitat that wildlife would use for a food source or shelter. A finding of no significant impact has been issued for testing and integration of many of these various types of weapon systems at designated target sites on Edwards AFB. When applicable, additional NEPA analysis and mitigation measures, as addressed for each type of weapons test, would be

implemented. Ground targets would be located on Edwards AFB and airborne targets would only be fired upon so that debris resulting from the destruction of any target would remain on base and in previously disturbed areas. Ground disturbing activities by test aircraft would not be anticipated, except at designated target sites.

4.4.2 Alternatives Considered

The primary areas that would potentially be affected by additional test flight operations are the plants, wildlife, and habitat at Edwards AFB. Except for approximately 5 percent of the flight operations, the aircraft would operate above 3,000 feet AGL, thus limiting the opportunity for potential impacts.

4.4.2.1 Alternatives A, B, and C

Alternative A, B, and C flight-related activities would occur over the R-2508 Complex—including restricted area R-2515—and on and over Edwards AFB; however, potential impacts, if any, would only be expected to occur at Edwards AFB. Direct or visual impacts on any plant, animal, or habitat would not occur off base from planned flight test activities. As noted in Appendix C1 habitat for bighorn sheep is known to occur within this ROI, but not on Edwards AFB. The majority of habitat that could be affected by noise is in the area of Sequoia-Kings Canyon National Park where flight scheduling is designed to minimize flight below 18,000 feet MSL unless specifically authorized and where flight is always absolutely restricted to flight above 3,000 feet AGL. While this requirement is not directly associated with bighorn sheep or other natural resources, these natural resources would benefit from it because of the limited potential impact to areas not occupied by these species. Figure 3-3 in Appendix D.2 shows the locations within the R-2508 Complex that are considered sensitive noise areas.

Plants, Wildlife, and Habitat

The greatest potential for plants, wildlife, and habitat to be affected by major or minor construction could occur if Alternatives A or B were implemented. To minimize impacts on natural resources, existing roads would be used as much as possible. However, since construction would be limited to previously disturbed areas and areas immediately surrounding the existing facilities, the potential for any impacts would be minimized.

Threatened and Endangered Species

Aircraft and support equipment would operate from previously disturbed areas that do not include the habitat that readily supports the threatened and endangered species found on Edwards AFB.

Consequently, direct contact with these species would not be anticipated; therefore, no significant impacts on threatened and endangered species or habitat identified in Section 3.4 would be expected.

Noise and Visual Effects on Plants and Wildlife

Adverse effects of noise and visual impacts on plants would not be expected. Noise is not a known stress factor for plants or plant habitats.

Noise and visual impacts on wildlife could occur for the portions of the flight operations conducted below 1,000 feet AGL, the altitude accounting for the most reaction to visual stimuli by wildlife (Bowles *et al.* 1991;Lamps 1989). The USFWS considers aircraft flight below 2,000 feet AGL a potential concern for listed species or species of concern. In general, wild animals respond to low-altitude aircraft overflights. The startle response to noise or a passing shadow is the most readily observed and documented response of wildlife to aircraft overflight, but the adverse effect of this response is considered to be of a short term (minutes). This short-term response will not influence the demographic characteristics or spatial distribution of any wildlife species. Birds and mammals have been frequently observed to habituate to noise. Neither amphibians nor reptiles have been shown to have a well developed acoustic startle response (U.S. Forest Service 1992). A study on the impact of low-level aircraft flights and sonic booms on desert tortoises determined they experience a temporary threshold shift in hearing, but recover rapidly (Bowles *et al.* 1999). Furthermore, the study determined that overflights resulted in a "slight freeze" response by the desert tortoise with no long term ill effects or changes in metabolic rates. No adverse impacts on the Mohave ground squirrel would be expected because no ground disturbance is anticipated and these animals spend about 8 months of the year in burrows below ground.

Because most flight operations would occur above 3,000 feet AGL, and these flight operations would be similar to current routine and recurring aircraft flight operations, noise and visual impacts would not be expected to be significant.

Migratory Birds and Executive Order 13186

Aircraft strike hazards, the primary threat to migratory birds, would be the same as for any other aircraft operating in the ROI. From 1985 to 1998, 168 incidents of bird strikes (approximately 12 per year) were reported for flight operations at Edwards AFB. Approximately 28 percent of those bird strikes occurred during low-altitude flight (Edwards AFB 2002). A comprehensive bird-aircraft strike hazard (BASH) program has been implemented at Edwards AFB to minimize habitat and vegetation that attract migratory and non-migratory species around the airfield. A 20 percent increase in flight operations could result in

two additional bird strikes (12 per year could increase to 14 per year). Consequently, test flight operations would not be expected to significantly increase the impact on bird species at Edwards AFB; and additional mitigation beyond the current BASH procedures would not be required.

4.4.3 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Potential impacts on natural resources from these flights have been addressed in other environmental documents listed in Appendix H, and it has been determined that these operations would continue within established Air Force guidelines. There would be no anticipated impacts on natural resources resulting from the No-Action Alternative.

4.4.4 Significance/Mitigation Measures

No significant effects on natural resources were identified during the analysis. For the Proposed Action and Alternatives, human presence and physical disturbance would be the most likely stressors; however, since human presence would be limited to previously disturbed areas, the potential for an impact on natural resources would be expected to be less than significant. Routine flight operations would have minimal contact with natural resources including plants, wildlife, and habitat because operations would primarily be conducted from previously disturbed areas that do not typically support these resources. Consequently, it could be reasonably concluded that impacts would be less than significant under Alternative A, B, C, or D. Test flight operations would abide by management practices that have been implemented by the AFFTC and Edwards AFB to minimize disturbances to natural resources. Consequently, no significant impacts on natural resources would be expected and no additional mitigation measures would be planned.

4.5 NOISE

The primary impacts on noise for the Proposed Action and Alternatives would be from aircraft, support equipment, traffic, and during the major or minor MILCON.

4.5.1 Data and Assumptions Used in the Analysis

4.5.1.1 Subsonic and Supersonic Noise

The noise contribution from subsonic flight operations at Edwards AFB resulting from a 20 percent increase in flight operations would increase the accepted L_{dn} or DNL by less than 1 dBA over current

levels. Since the increase in subsonic sound levels would be less than 1 dBA (30 percent of the level that would trigger a requirement for further analysis), the increase resulting from additional flight operations would not be expected to create any significant impacts on subsonic noise.

Impulse noise from sonic booms is measured differently than subsonic noise. Figure 3-5 in Appendix D shows that up to 5 sonic booms per day would be below the acceptable threshold if the intensity of the sonic boom on the ground were below approximately 5.50 psf. The normal overpressure for sonic booms at Edwards AFB is nominally around 1.3 psf (AFFTC 2001b) although some aircraft produce sonic booms with intensities up to 2.5 psf. From 1980 to 1999 there was an average of 607 supersonic flights conducted annually over Edwards AFB and in the designated supersonic flight corridors and restricted area R-2515. In 1999, there were 740 supersonic flights for 15,692 sorties; approximately 5 percent of the total aircraft sorties flown in the R-2515 were supersonic (approximately 3 per day). Of the aircraft listed in Table 2-1, supersonic capable aircraft could fly 1,600 sorties. If 20 percent of the new mission sorties were flown at supersonic speeds, then approximately 320 additional supersonic flights would occur each year. That would increase the total number of supersonic flights to approximately 1,060 annually, or 4.24 per day (based on 250 flying days per year), and would be 15 percent below the acceptable level of 5 sonic booms per day. Consequently, it could be reasonably assumed the noise from the sonic booms from the additional flight operations would be below the threshold for the level of acceptability.

4.5.1.2 Construction-Related Noise

For the purpose of this assessment, construction-related noise would be categorized as localized or regional. Localized noise impacts are those that occur within or adjacent to the project construction site and regional impacts refer to those occurring at off-site locations (e.g., Rosamond Drive, Highway 58, Highway 14, or U.S. Highway 395) due to the increase in traffic. Construction-related noise typically occurs intermittently and varies depending upon the nature or type of construction (e.g., demolition, land clearing, grading and excavation, or erection of a structure) and would have no permanent effect on the ambient noise level. Construction-related activities would occur in the cantonment area, which is several miles from schools, residential, hospitals, and childcare facilities (see Figure 3-4 in Appendix D.2). Increases in ambient noise levels associated with the Proposed Action would be considered local, short-term, moderate, and adverse under NEPA. To reduce the potential moderate adverse effects to less than significant, mitigation measures would be implemented if Alternative A or B were implemented.

4.5.2 Alternatives Considered

4.5.2.1 Alternatives A, B, and C

R-2508 Complex and Restricted Area R-2515

Based on the number of flight operations that occur annually within the R-2508 Complex, the addition of up to 2,000 aircraft sorties would represent a 5.9 percent increase in activity. As was shown in the *Environmental Assessment for Continued Use of Restricted Area R-2515* (AFFTC 1998b), adding the F-22 flight test program which comprises more than 6,500 F-22, F-16, and support aircraft sorties, would result in a potential noise level increase of 6 percent and would result in no significant noise impacts. Therefore, one could reasonably assume that adding 2,000 flight sorties (70 percent less than the proposed F-22 flight activity) for other similar types of aircraft would also result in less than significant noise impacts (AFCEE 2001). Therefore, based on Federal Interagency Committee on Noise policy, the increase in subsonic noise resulting from up to 2,000 flight operations would not require further evaluation and it could reasonably be concluded that no significant impacts on noise would result from the additional flight activity.

Edwards AFB

The potential impact of up to 2,000 additional aircraft flights annually would represent a 20 percent increase in flight operations at Edwards AFB (AFFTC 2006) over current levels but would still be less than the flight activity experienced in the 1980s and 1990s. The predicted SEL for various aircraft similar to those that may be used as test aircraft are shown in Table 4-8. These representative aircraft (except for the A-10) shown in Table 4-8 routinely operate from Edwards AFB. Adding these flights would cause an increase in the DNL. However, since the increase in subsonic noise would be less than 2 dB DNL, an update of the Air Installation Compatible Use Zone would not be required. As shown on Figure 3-4, in Appendix D, residential areas are well beyond the 65 dB CNEL contours.

Table 4-8 Predicted SELs for Surrogate Aircraft

Aircraft Type	200 feet AGL (dBA)	500 feet AGL (dBA)	> 85 dBA
A-10	104.9	97.6	1,600 feet AGL
F-15	123.6	117.0	10,000 feet AGL
F-16	129.5	122.2	14,000 feet AGL
F-22	121.3	114.5	8,000 feet AGL

Notes: dBA A-weighted decibels
AGL above ground level
SEL sound equivalent level

Source: SELCal 2006

Noise Impacts from Flight Operations Exceeding the Speed of Sound and Subsonic Operations

The noise impacts from supersonic flight operations would be expected to be below the threshold level of acceptability; thus, no specific mitigation would be required. The current 65-dBA CNEL contour as shown in Figure 3-4 in Appendix D, is contained entirely within the base boundary at Edwards AFB. Therefore, a less than 1-dBA increase in DNL would not be expected to significantly increase the CNEL contours, which would remain within the base boundaries, and no mitigation would be required.

Noise Impacts on Wildlife

A wide range of impacts on wildlife due to aircraft overflights has been reported in literature. Behavioral responses are highly variable depending on the method of study, species in question, special and temporal parameters, and other characteristics (95 ABW and AFFTC 2005b).

After years of study of the effects of noise on natural resources, the information and data collected do not support the contention that noise generated by aircraft harms biological resources (95 ABW and AFFTC 2005b). However, the effects of military flight operations on wildlife can be summarized:

- There is no evidence to support the conclusion that noise and sonic booms associated with military overflight activities have a negative effect on populations of wild animals; and

- Habituation to aircraft noise occurs with most species.

4.5.2.2 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Potential noise impacts from these flights have been addressed in other environmental documents, and it has been determined that these operations would continue within established Air Force guidelines. There would be no unanticipated impacts from noise resulting from the No-Action Alternative.

4.5.3 Significance/Mitigation Measures for Noise

4.5.3.1 Significance/Mitigation Measures for Noise Impact in the R-2508 Complex

Aircraft noise will remain less than significant because the Air Force and FAA have established guidelines and mitigation measures to ensure aircraft remain clear of sensitive areas as shown on Figure

3-3 in Appendix D.2. Consequently, aircraft will maintain a minimum altitude of 3,000 feet AGL vertically and 3,000 feet laterally when flying near the noise sensitive areas in the R-2508 Complex as described in the *R-2508 Complex Users Handbook* (Edwards AFB 2007). This would include flight operations in the Isabella, Owens, Panamint, and Saline work areas that overlie several land management areas including:

- Sequoia-Kings Canyon National Park;
- John Muir Wilderness;
- Domeland Wilderness (1977 boundaries); and
- Death Valley National Park (boundaries as designated for Death Valley National Monument in 1994).

Low-level operations over the Sequoia National Forest are also limited from May 23 to September 30 after 8:00 p.m. on all Friday, Saturday, and Sunday nights, and during the Memorial Day, Independence Day, and Labor Day weekends. This excludes mission essential flights that have been coordinated with the Central Coordinating Facility at least 3 working days prior to the low-level flight.

4.5.3.2 Significance/Mitigation Measures for Construction-Related Noise Impacts

Although construction-related noise would be intermittent and have no long-term impact on ambient noise conditions, the short-term impacts would be localized and considered moderately adverse according to NEPA guidelines. To ensure construction-related noise does not create any lasting significant effects, the following mitigation measures will be implemented to minimize construction-related noise:

- All construction vehicles or equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers and acoustical shields or shrouds, in accordance with manufacturers' recommendations or best management practices;
- Noise-generating construction activities associated with the project will comply with the following limitations on hours of operation: construction activities shall be limited to the hours of 7:00 a.m. to 10:00 p.m. from Monday through Friday, and between 9:00 a.m. to 10:00 p.m. on Saturday and Sunday; and
- Truck routes will be established that minimize noise impacts on residential and administrative areas.

4.6 INFRASTRUCTURE

4.6.1 Alternative A, B, and C

4.6.1.1 Water, Wastewater, Electricity, Natural Gas, and Communications

New programs on the base may require renovation and additions to facilities to meet program needs. Construction activities associated with the Proposed Action have the potential to impact existing infrastructure such as communications, water, wastewater, electrical, and natural gas through accidental penetration. Service interruption due to repair and replacement of the utility lines could affect production schedules, testing and development, and lead to administrative inefficiencies. However, beneficial aspects of changes to the infrastructure, such as the utility systems, would indirectly have a positive effect on program efficiencies by improving the working environment and thereby enhancing worker productivity.

Energy measures incorporated into the design of newly constructed facilities have the potential to reduce the energy costs as compared to standard construction designs. These measures include the incorporation of energy-saving heating, ventilation, and air conditioning systems; hot water systems; and energy management control systems, and could result in a substantial cost savings to the Air Force. Use of these measures would contribute to the achievement of energy-reduction goals and requirements established in P.L. 102-486, *Energy Policy Act of 1992*, and EO 13123, *Greening the Government through Efficient Energy Management*.

4.6.1.2 Traffic and Circulation

Proposed project activities have the potential to impact the transportation system through traffic delays or the temporary closure of roadways on Edwards AFB. Traffic delays are anticipated due to slow-moving equipment using the existing roadways. These impacts would be expected to be short-term, lasting only as long as required to accomplish the work. Road closures or the rerouting of traffic would be temporary, lasting only as long as necessary to ensure personnel safety while completing the required work. Early coordination with base organizations would ensure that necessary safety precautions are taken, and would allow ample advance notice to affected commuters and personnel.

During construction of the various buildings and squadron operating areas there may be a short-term disruption in vehicular traffic and available parking until the new facilities are completed. Construction of new infrastructure would include widening access roads and installation of additional parking areas.

These improvements would have long-term effects that would benefit the area by easing projected traffic congestion and accessibility to adjacent facilities. No significant impacts are anticipated.

4.6.2 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. The effects on infrastructure from these flights have been addressed in other environmental documents, and it has been determined that these operations would continue within established Air Force guidelines without creating any significant impacts on the infrastructure. There would be no unanticipated impacts on infrastructure resulting from the No-Action Alternative.

4.6.3 Significance/Minimization Measures for Infrastructure

If Alternative A or B is chosen, improvements to the infrastructure would create minor impacts. These impacts would be less than significant, but would affect the infrastructure during construction phase because of minor outages of utilities and changes in traffic patterns. To minimize these impacts, the following measures will be implemented:

- All work that would affect closure, rerouting, or modification of roadways, streets, or highways shall be coordinated 15 days in advance with the Security Forces, Base Fire Department, and Public Affairs Office. A current copy of the California Department of Transportation *Manual of Traffic Controls for Construction and Maintenance Work Zones* (California Department of Transportation 1990) shall be used as guidance for traffic signs.
- The proponent/contractor shall be responsible for obtaining an AF Form 103, *Base Civil Engineering Work Clearance Request* (digging permit). Contact the Base Civil Engineer Infrastructure Controller for coordination.
- Some utilities require a representative to be present on-site at all times when motorized construction equipment is being used closer than 20 feet from existing lines. The project sponsor shall coordinate with the Civil Engineer Group in order to identify the location of affected lines.
- If current as-built drawings indicating the location of existing utility lines are not available, mechanical digging cannot be performed within 4 feet of utilities or communication cables until the lines are physically exposed by hand digging.

4.7 SAFETY AND OCCUPATIONAL HEALTH

The primary impacts on safety and occupational health from the Proposed Action and Alternatives would be from flight, ground, range, weapons, and test [systems] safety hazards as well as radiological, biological, chemical, and physical hazards, normally associated with aircraft flight operations at Edwards AFB. Additionally, during construction activities, physical hazards as well as noise hazards could create adverse impact. Extensive training of personnel, specific operating procedures, safety and hazard zones that restrict access to dangerous areas or operations, and continuous monitoring by base and range safety personnel would ensure flight operations are conducted in a manner that reduces the opportunity for an impact on safety and occupational health.

Many of the project activities would occur adjacent to the Main Base flightline and within or adjacent to several restoration sites. Compliance with the measures listed in Section 4.7.2 would minimize health and safety hazards to personnel. Therefore, no adverse impacts to safety and occupational health are anticipated.

4.7.1 Data and Assumptions Used in the Analysis

Maintenance and flightline personnel at Edwards AFB routinely service test aircraft and chase aircraft (similar to the F-15 and F-16). Personnel associated with flight operations would be trained to identify new hazards and would be trained on procedures to minimize personal risk from those hazards.

Because the noise levels created by test aircraft would exceed 85 dBA, maintenance and flightline personnel would be instructed on the use of ear protection as required by the Occupational Safety and Health Administration (OSHA 1981) and the hearing protection/conservation program. Such safety programs are currently institutionalized for all ground operations at Edwards AFB; therefore, no new safety measures would be required.

The handling and storage of the munitions is conducted in accordance with the explosive safety procedures contained in Air Force Manual 91-201, *Explosive Safety Standards*. Munitions are stored and handled on the flight line in specified areas subject to strict management. Currently, PB-13 is the only target site on Edwards AFB cleared for the use of up to 500 pounds of net explosive weight–armed munitions. The minimum clear zone for 500-pound armed munitions in an aircraft parking area is approximately 240 feet (DoD Directive 6055.9).

A crash of an aircraft or an off-target impact of a laser beam, high power microwave beam, or ordnance could result in unavoidable adverse impacts on natural resources. However, because test procedures and safety criteria will be strictly adhered to, there is a low probability of a crash. The whole purpose of this program is to aid in the integration weapon systems with improved accuracy that can be deployed on a variety of aircraft. Accuracy of the Air Force weapons over the years has improved dramatically. For example, in 1944 the Eighth Air Force achieved an accuracy of only 7 percent with bombs hitting within 1,000 feet of their aim point. The circular error of probability for World War II was 3,300 feet, 1,000 feet in Korea, and 400 feet in Vietnam. By the Gulf War the "smart airplane" dropping dumb bombs from low altitude could place an unguided munition within 30 feet of a target. Hellfire missiles fired by an Apache helicopter reported 102 direct hits out of 107 missiles expended (a hit rate of better than 95 percent). By following the strict test procedures, flight operations and testing new systems would not result in any significant unavoidable adverse impacts on natural resources.

4.7.2 Alternatives A, B, and C

Although there would be a 5.9 percent increase in flight activity within the R-2508 Complex and a 20 percent increase in flight activities at Edwards AFB, if all the proposed flight operations were added, this level of activity would still be more than 40 percent below the activity level of the 1990s. Because the DoD and NASA have implemented specific safety and occupational health guidelines and procedures and conduct required safety training for all maintenance and flight line personnel involved with these programs, the likelihood that a significant impact on safety or occupational health resulting from flight operations is highly unlikely to occur.

Pilots are trained and tested on safety procedures and undergo routine flight proficiency tests, thus minimizing the potential flight risks associated with operating these types of aircraft.

Safety interlocks, administrative controls, and hazard safety zones are incorporated with all weapons delivery activities, thus minimizing the potential for inadvertent release of any explosive devices. Munitions are stored in safe areas and managed in accordance with strict handling and safety procedures.

Construction activities could create safety and occupational health effects if safety plans are not followed by personnel accomplishing the work. The construction contractor would be required to have a site-specific health and safety plan, conduct daily safety briefings with workers, maintain supervision on-site, and verify that work is being accomplished according to the site construction plan. Consequently, the potential for any impacts would be minimized and one could conclude that significant safety and occupational health impacts would not be likely to occur.

4.7.3 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Potential safety and occupational health impacts from these flights have been addressed in other environmental documents, and it has been determined that these operations would continue within established Air Force guidelines. There would be no new impacts on safety or occupational health resulting from the No-Action Alternative. Consequently, there would be no significant impacts on safety and occupational health if the No-Action Alternative were implemented because no new actions would occur; consequently, no planned mitigation measures would be required.

4.7.4 Significance/Mitigation Measures

No significant effects or impacts on safety or occupational health resulting from these new test missions were identified during the analysis, no mitigation measures would be required. The following measures would be implemented if Alternative A or B was chosen and construction activities were to occur.

The contractor shall be registered with Cal-OSHA and must fully understand and adhere to the contents of the following:

- Title 8 CCR, Section 3203, Injury and Illness Prevention Program.
- Title 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants.

Trenching and digging below the ground surface at an Environmental Restoration Program site may result in encountering contaminated soil above a preliminary remediation goal and may require a site-specific health and safety plan, which the contractor shall prepare prior to starting any excavations. During excavation activities where soil and/or groundwater in the area may be contaminated, workers may be exposed, through inhalation, to contaminated dust or VOCs. The contractor will contact the 95th Aerospace Medical Squadron/Bioenvironmental Engineering (95 AMDS/SGPB) regarding health and safety plan concerns.

All personnel present within hazardous noise areas as stated in Air Force Occupational Safety and Health Standard 48-19, *Hazardous Noise Program*, shall follow the applicable hearing protection guidelines. Hearing protection would still be required for any personnel on the flightline or in other areas where the noise level is above 85 dBA.

4.8 SOCIOECONOMICS

4.8.1 Alternatives A, B, and C

4.8.1.1 Population

Under the Proposed Action up to 1,500 additional military and civilian contractor personnel would be employed at Edwards AFB. Based on the average accompanying dependent factor of 1.8 (AFCEE 2001), direct population changes as a result of the flight test operations would be an increase of approximately 4,200 people (1,500 military personnel and civilian contractors and 2,700 dependents). Considering that in Kern County alone, the population was 734,077 in 2004 (Bureau of Economic Analysis 2007), this change would represent less than 0.5 percent of population in the affected area as shown in Figure 1-1. Consequently, one could assume that no impacts on population would occur as a result of implementing the Proposed Action or Alternatives.

4.8.1.2 Employment and Income

The combined salaries for the additional 1,500 on-base personnel would total approximately $36.5 million (Defense Finance and Accounting Service 2000; U.S. Office of Personnel Management 2000) and approximately $65.7 million for the additional 2,700 increase in population based on the per capita personal income value of $24,335 (Bureau of Economic Analysis 2007). It is assumed that these personnel would in-move to the area for employment. In fiscal year 2004, federal payments to individuals in Kern County were in excess of $748 million and the total personal income was $17,863,687,000. Consequently, one could assume that a $102 million ($36.5 million plus $65.7 million) increase in wages would result in a minor beneficial impact on the local economy.

4.8.1.3 Housing

In 2003, according to the American Community Survey, there were 242,622 housing units in Kern County (a 90 percent confidence factor) of which 224,310 units were occupied (U.S. Census Bureau 2006) and more than 18,300 units were unoccupied. Because the population and housing starts in the area of concern is consistent throughout the area, one could assume that an increase in population of less than 0.5 percent would easily be supported by the availability of housing where 7 to 8 percent of the available housing market was unoccupied. Similar statistics for housing within 50 miles (in Los Angeles and San Bernardino Counties) would be expected. Consequently, one could conclude that an increase of 4,200 people would not have a significant impact on housing if the Proposed Action or Alternatives were implemented.

4.8.1.4 Schools

In 2006, it was estimated that 98,999 children were enrolled in local schools (see Table 3-5) and 35,191 in local colleges or graduate school (U.S. Census Bureau 2006). If 46 percent, or 1,772 dependents, enrolled in local schools, there would be a 1.3 percent increase in students attending the local area schools, which should be within the capacity of the local schools to absorb.

4.8.2 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Potential socioeconomic impacts from these flights have been addressed in other environmental documents, and it has been determined that these operations would continue within established Air Force guidelines. There would be no unanticipated impacts on socioeconomics resulting from the No-Action Alternative.

4.8.3 Significance/Mitigation Measures

No significant effects or impacts on socioeconomics resulting from implementing the Proposed Action were identified during the analysis. Analysis indicated that an increase in housing and population would be less than 2 percent and minor beneficial increase in the economy due to increased wages and spending would occur as a result of implementing the Proposed Action. No mitigation measures would be planned or required.

4.9 CUMULATIVE IMPACTS

4.9.1 Introduction

The CEQ regulations define “cumulative impact” as the impact on the environment from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The U.S. EPA suggests that in reviewing cumulative impacts the reviewers should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed actions and other actions in the same geographic area. This can be determined by considering:

- Whether the resource is especially vulnerable to incremental effects;

- Whether the proposed action is one of several similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

Additionally, the reviewers should determine whether the NEPA analysis has used geographic and time boundaries large enough to include all potentially significant effects on the resources of concern. Geographic boundaries should be delineated and include natural ecological boundaries and the time period of the project's effects.

The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (to what extent); whether ongoing activities in the area are causing impacts; and the trend for activities and impacts in the area (U.S. EPA 1999b).

The ROI for cumulative impacts analysis includes Edwards AFB, restricted area R-2515, the R-2508 Complex, and Sea Range. Specific projects that have occurred, those currently taking place, and those projected for the future are identified in Section 4.9.2.

4.9.2 Past, Present, and Reasonably Foreseeable Actions

Over 90 to 95 percent of the past, present, and reasonably foreseeable actions occurring in the ROI are associated with ongoing operations at Edwards AFB. Other major actions and projects considered and addressed here would represent only a very small percentage of the total number of actions.

4.9.2.1 Flight Operations at Edwards AFB

Since 2000, the level of flight activity at AFFTC and Edwards AFB has remained fairly constant. Typically, when a flight test program is completed a new flight test program begins. The number of personnel, vehicles, aircraft, and basic infrastructure needed to support these flight activities is proportional to the number of sorties flown. The number of sorties associated with operations at Edwards AFB (including NASA-related flights) from 2000 through 2005 have been approximately 10,250 per year (AFFTC 2006). The number of sorties has varied from a 7.5 percent reduction from 2000 to 2001, a 2.7 percent increase from 2002 to 2003, and 9.0 percent decrease from 2003 to 2004 and 2004 to 2005. Detailed information showing the breakdown by aircraft type and sorties for those years can be reviewed

in Appendix B.1, Table B-1. These aircraft regularly use the runways at Edwards AFB, restricted area R-2515, R-2508 Complex, low-levels routes, supersonic corridors, and targets on the PIRA to test aircraft integration and system capabilities. Overall, flight test operations at Edwards AFB have been analyzed in the *EA for the Continued Use of Restricted Area R-2515* (AFFTC 1998b); analysis for the proposed action in that EA concluded the operations would result in no significant cumulative impacts.

Considering up to 2,000 additional sorties as an increment to existing operations is probably the worst case assumption; the evaluations completed for the overall flight test activity at Edwards AFB cited were done with consideration for the normal and continuous initiation and completion of flight test programs. The Proposed Action as addressed in this EA would add more flight operations to actions already analyzed, but would still be well below the number of flight operations conducted in the 1980s and 1990s. In general, since the operations (airspeeds, altitudes, aircraft type) of these test flights would be similar to those already evaluated, it would be expected these flights would have no measurable cumulative impact on most of the existing environment.

4.9.2.2 Other Projects and Foreseeable Actions

Table 4-9 lists other projects and foreseeable actions that are scheduled to occur and identifies potential cumulative impacts.

Table 4-9

Projects with Potential Cumulative Impacts

Project	Description	Potential Cumulative Impacts
Edwards AFB Runway Replacement Project	The main runway is being replaced in three phases.	None. Project should be completed prior to start of testing.
Testing and Evaluation of Directed Energy Systems	Testing laser and high power microwave systems against targets at Edwards AFB. Projected from 2006 to 2012.	Minimal. Up to 2,000 additional flights per year would require TRACON monitoring and flight management.
West Mojave Plan	Covers 9.4 million acres including most of the California West Mojave Desert. Objective to conserve and protect desert tortoise, Mohave ground squirrel, and over 100 other species.	None. No direct contact with any of these species is expected. Flights will fly over area, infrequent noise would be heard on the ground; however, all aircraft would be above 3,000 feet except when landing at Edwards AFB or on authorized low-level routes.
Livestock Grazing Authorization	Permit grazing by various types of livestock on BLM lands at various sites beneath the corridors.	No direct contact with any of these grazing areas is expected. Noise would reach the ground; no anticipated long-term effects.
Naval Air Station China Lake	Testing and training on the ranges at NAWS China Lake support DoD and NASA flight and ground operations.	Minimal. Additional proposed flights would require TRACON monitoring and flight management, which is part of normal activity.

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Table 4-9

Projects with Potential Cumulative Impacts

Project	Description	Potential Cumulative Impacts
Naval Air Station Lemoore Military Operations Area	New military operations area would extend from 5,000 to 35,000 feet over parts of California.	None. The NAS Lemoore MOA is outside the R-2508 Complex.
Low-Level Testing and Evaluation at Edwards AFB	Flight tests from Edwards AFB and other DoD and NASA aircraft use 30 previously established routes for low-level flight training.	Minimal. The additional new mission flight tests would add more noise; however, flights would comply with altitude restrictions and mitigation measures established to minimize noise impacts; consequently, noise from low-level flights would not be expected to create any significant impacts.
Wind Energy Project for Eleven Western States	BLM studied the impacts of wind energy development over the next 20 years. Wind turbines are known to create noise and visual impacts in the immediate area.	None. The additional new mission flight tests would add more noise; however, the noise would be minimized in sensitive areas, and no significant impacts would be expected.
Hypersonic Corridors Flight Corridors	Air Force and NASA propose testing hypersonic vehicles over four corridors extending up to 825nautical miles from Edwards AFB.	Minimal. The additional 2,000 flight tests would add more noise; however, the noise over sensitive areas is minimized by imposing altitude restrictions on aircraft. No significant long-term impacts would be expected.

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4.9.3 Overview

While each of these projects and programs presents opportunities for cumulative impacts, the combined effects of these cumulative impacts are not expected to be significant. Potential cumulative impacts with regard to resource areas are discussed in the following sections.

4.9.3.1 Airspace Management and Air Safety

Regarding U.S. EPA's considerations, airspace management and air safety are vulnerable to incremental effects. If the cumulative actions were to overload the capacity of the airspace or the controller's ability to manage flight activity, then cumulative impacts would be considered significant. With regard to other projects and flight operations occurring in the R-2508 Complex, the number of flight activities in SUA is strictly controlled, thus minimizing potential impacts. Similar actions are occurring in the R-2508 Complex (including NAWS China Lake, and the Sea Range; however, each range manages and controls the number of activities within its boundaries, thus limiting potential cumulative effects. Historically, the number and type of flight operations in the R-2508 Complex have not created airspace management and air safety issues because the flight planning and safety process has included risk analysis and the

implementation of safety measures for each activity. Only flight activities that meet the flight safety criteria have been allowed to launch from Edwards AFB and operate in the R-2508 Complex. Because all flight activities in the R-2508 Complex are scheduled and limited by the scheduling agency, the potential for cumulative impact has not been seen as a result of other proposed actions.

The Edwards AFB runway replacement project and flight operations in a new Naval Air Station Lemoore MOA all have the potential for cumulative impacts when combined with the new mission flight tests. Flight activities at Naval Air Station Lemoore MOA would be expected to segregate flight activities, thus minimizing potential conflicts and cumulative effects.

Cumulative air safety impacts for aircraft are primarily affected by the number aircraft being controlled, the airspace they are operating in, their reliability, and the capabilities of the pilots. The cumulative number of aircraft is well within the capacity of the controllers to manage and monitor. Scheduling is coordinated with local FAA representatives to ensure the number of flights launching from the facility is within their capability to handle safely. If there is a potential overload, the FAA can delay a launch until an opening into the NAS is available or put an aircraft in a holding pattern until a route is safe for the aircraft to continue. Most aircraft flight operations would be conducted in the SUA of the R-2508 Complex; an operating area specifically designated for this type of activity where it can be segregated from other air traffic. Aircraft pilots are highly trained for their specific type of aircraft in strict compliance with FAA and/or DoD training standards. Consequently, cumulative air safety impacts would be minimized by the processes in place, thus ensuring that no significant impacts would result from consolidated flight operations.

4.9.3.2 Air Quality

The potential cumulative air quality impacts would result from operations occurring below 3,000 feet AGL. Emissions created by flight activity as addressed in Section 4.1, would be well below *de minimis* threshold levels. In recent years, air emissions from aircraft have occurred for over 12,500 sorties without creating any significant air quality impacts. The cumulative totals based on the historical trends would result in a similar number of sorties; therefore, the cumulative effects would be expected to be less than significant. The runway replacement project would have the greatest potential for cumulative air quality impacts on Edwards AFB if the project were delayed. Air quality in the area is vulnerable to incremental cumulative effects. If emissions from other projects occurring in the same geographic region were to exceed the threshold *de minimis* values, then the effects on air quality would be significant. Consequently, air quality permits would be reviewed to ensure emission levels would remain below

threshold limits. These potential cumulative impacts will be discussed in separate environmental analyses being developed to support the runway replacement project. Cumulative air emissions considered from other similar actions in the R-2508 Complex would include activities at NAWS China Lake and Fort Irwin. Because activities for these other areas are in different air districts, have their own attainment status, and emissions below 3,000 feet AGL are geographically separated by mountain ranges that minimize the mixing of emissions from these areas, the cumulative effects for air quality would not impact the Edwards AFB area. Another project noted in Section 4.9.2.2 that is in another air district is the Naval Air Station Lemoore MOA; air emissions from this area would not contribute to cumulative effects for the same reasons as stated above.

Air quality impacts from proposed projects at Edwards AFB would not individually result in any significant long-term impacts, although they may result in localized impacts of short duration. Since most projects at Edwards AFB are primarily aircraft related, the air quality impacts of any significance would occur as a result of aircraft launch and recovery operations while the aircraft are operating below 3,000 feet AGL or as a result of testing a weapon system at one of the approved target sites within the R-2508 Complex (Edwards AFB, NAWS China Lake Range, or Fort Irwin). Other air quality impacts would result from permitted open burn/open detonation events that occur on the ranges. Due to the nature of the detonation process, the chemicals in these emissions are consumed as part of the process. The air emissions from vehicles and support equipment would be expected to be similar to current levels and would be below threshold *de minimis* levels.

The aviation sector currently emits about 2.6 percent of the nation's greenhouse gas emissions with the United States military contributing only a small portion. Military aviation used approximately 0.5 percent of the United States aviation fuel in 2000. Consequently, one could assume that adding up to 2,000 flights per year would increase emission of greenhouse gases; however, the addition would be insignificant in comparison the hundreds of thousands of commercial flights occurring nationwide.

4.9.3.3 Natural Resources

The consolidated flight operations would not create a significant cumulative impact on natural resources. As noted in Section 4.4, the greatest potential for impacts on natural resources occurs when vehicles are driven on unpaved roads adjacent to undisturbed areas. A runway replacement project could result in cumulative impacts if the vehicles and equipment were driven over undisturbed areas. However, monitoring the vehicles and training the operators would minimize the potential for these impacts. The flight operations would not result in any changes to grazing patterns as authorized by the BLM; therefore

cumulative impacts from the Livestock Grazing Authorization would not be expected to result in any additional cumulative impacts on natural resources. The cumulative effects of the windblown soils and contaminants on plants in the target areas would be considered less than significant. The immediate target areas on the Edwards AFB, NAWS China Lake, and Fort Irwin ranges are generally devoid of plants, and the areas outside the immediate target areas are sparsely populated with plants. Edwards AFB, NAWS China Lake, and Fort Irwin (located in the Mojave Desert area) routinely uses their target sites for flight and weapons systems testing. Because these target sites are generally devoid of plants and habitat for wildlife, significant impacts are not expected. There are no records of direct impacts to plants or sensitive species resulting from the use of these targets and test sites. Because natural resources are similar on these DoD ranges and there is a lack of any identified impacts, consolidated flight operations that use the target sites would have a less than significant impact on the plant species surrounding the target area. If a Mohave ground squirrel, desert tortoise, or other sensitive or endangered species were struck by debris or the effects from a weapon system, they could be injured or killed. However, mitigation measures coordinated with and approved by the USFWS would be implemented to minimize this type of potential cumulative impact. As noted above, approximately one-third of the 9.4 million acres of the West Mojave Plan is located on military bases. As such, the protection and avoidance measures for the desert tortoise, Mohave ground squirrel, and other species are implemented via operating procedures, test plans, and Air Force guidance, thus minimizing the potential for cumulative impacts.

Cumulative noise impacts on wildlife are not expected. Cumulative noise resulting from the runway replacement project would be limited to disturbed areas, roadways, and burrow pits. Wildlife in these areas is limited; thus the potential for impacts would also be limited. The numbers of future flight operations are consistent with current and projected flight activities. Although most of the operations would be above 3,000 feet AGL, the noise may produce a startle effect in some species. Studies have shown that wildlife acclimate to noise or leave the area of high noise. Most of the noise that would potentially affect wildlife would typically occur when the consolidated test mission aircraft were taking off and landing on runways at Edwards AFB or below 1,000 feet AGL. In other phases of the flight operations (other than takeoff and landing) the aircraft would typically be above 3,000 feet AGL—except for approximately 5 percent of the flights—thus minimizing the potential for affecting wildlife. Mitigation measures that minimize potential noise impacts from flight operations are identified in the *R-2508 Complex User's Handbook* (Edwards AFB 2007).

4.9.3.4 Noise

Several sources of noise were evaluated to determine if, when considered comprehensively, they would result in cumulative noise impacts. These include aircraft, transportation, construction, and detonation-related noise. The noise impacts of bombs, rockets, and missile detonations and sonic booms can result in a similar response. Noise from these sources is measured in pounds per square foot and is impulsive. As such, these impacts are considered together.

The aircraft generating sonic booms which impact the ROI operate in the High Altitude Supersonic Corridor (limited to altitudes above 30,000 ft MSL only), which lies directly above Edwards AFB as well as in the Alpha Corridor/Precision Impact Range Area (PIRA) and the Black Mountain Supersonic Corridor at all altitudes. These aircraft are primarily the T-38, F-15, F-16, F-18, and F-22; they are flown at speeds that range from Mach 1.0 to Mach 2.0 (678 to 1,356 miles per hour) in specific designated areas. These flights generate sonic booms with intensities up to approximately 2.5 psf. In the *EA to Extend the Supersonic Speed Waiver for Continued Operations in the Black Mountain Supersonic Corridor and Alpha Corridor/PIRA* (AFFTC 2001b) it was estimated that over 600 supersonic flights (approximately 6 percent of the total number of flights) were conducted through this area annually (AFFTC 2001b). From 1997 through April 2001, only 56 noise complaints were received from persons within 50 miles of the corridors. Use of the local supersonic corridors by these aircraft does create additional noise impacts; however analysis has shown these noise levels do not create a significant adverse impact (AFFTC 2001b). The addition of up to 2,000 sorties would also create noise impacts; however only a small percentage of those flights (approximately 6 percent of the 1,600 sorties [A-10 flights were excluded from the total because they cannot achieve supersonic speeds]) would create sonic booms. Approximately 703 supersonic flights would be projected to occur annually (96 from new missions and 607 from existing missions [AFFTC 2001b]), or 2.8 per day (based on 250 flying days per year). Based on studies and as shown on Figure 3-5 in Appendix D.2 up to 10 sonic booms per day would not create a significant adverse noise impact at Edwards AFB; consequently, one could assume that no significant impacts would be expected by adding 96 supersonic flight per year.

Construction activities for the replacement runway at Edwards AFB would increase the noise levels for the duration of the replacement process. However, it would only last until the end of 2008. Construction activities under Alternatives A and B would also be of limited duration, and mitigation measures to reduce the potential affects would be implemented; consequently, additional construction-related noise would not have a cumulative environmental impact past 2010.

The noise generated from these additional flight operations resulting from testing of bombs, rockets, or missiles would increase the noise in the ROI; however, this additional increase would add to the noise in the ROI only for very brief periods of time and would be less than significant. It must be noted, however, that target areas on the DoD ranges are located in extremely remote areas and the closest off-range inhabitants are miles from the targets. The noise values that would result from these flights are lower than ambient noise created from other civilian noise sources. Therefore, less than significant cumulative noise impacts are anticipated if the Proposed Action or Alternatives are implemented.

4.10 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts include those impacts that are negative, occurring regardless of any identified minimization measures. There would be locally significant concentrations of air pollutants resulting from increased air emissions from these flight test and air migrating from other air districts. Concentrations added from this Proposed Action would be below *de minimis* threshold values.

Unavoidable impacts on natural resources are likely to occur. The Proposed Action would likely prevent the re-growth of small areas of terrestrial plant communities and reintroduction of any wildlife habitat to various target sites and building sites adjacent to the runways or taxiways. Typically, target areas used during any flight activities have been previously disturbed, so the plant communities are of marginal quality for wildlife.

4.11 SHORT-TERM IMPACTS OR USES VERSUS LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

Examples of short-term uses of the environment include direct, construction-related disturbances and direct impacts associated with the indirect increase in population and activity that occurs over a period typically less than 5 years. Long-term uses of the environment include impacts occurring over a period of more than 5 years, including permanent resource loss.

New construction would create only temporary disturbances. The construction of up to approximately 500,000 square feet of buildings, hangars, and parking areas would provide for permanent employment and increased economic benefit. Air Force and contractor personnel from Edwards AFB and other bases would be used for the program; however, Alternative A, B, C, nor D would involve any short- or long-term significant changes in population or productivity of the environment.

4.12 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable natural resources and the effects that the use of those resources will have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., fuel and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of implementing an action (e.g., extinction of a rare or threatened species, or the disturbance of an important cultural resource site). In accordance with NEPA (40 CFR 1502.16), this section includes a discussion of any irreversible and irretrievable commitment of resources associated with the proposed project.

This programmatic EA only addresses the flight and supporting ground maintenance operations for additional aircraft on DoD test ranges, restricted areas, warning areas, and the NAS. Implementing any of these proposed actions would not require an irreversible or irretrievable commitment of resources. Implementation of Alternative D (No-Action Alternative) would also not require an irreversible or irretrievable commitment of resources.

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8.0 ACRONYMS AND ABBREVIATIONS

95 ABW	95th Air Base Wing
95 ABW/CEV	95th Air Base Wing/Environmental Flight
95 AMDS/SGPB	95th Air Base Wing/Bioenvironmental Engineering
AFB	Air Force Base
AFFTC	Air Force Flight Test Center
AFFTCI	Air Force Flight Test Center Instruction
AFI	Air Force Instruction
AFIERA	Air Force Institute for Environment, Safety and Occupational Health Risk Analysis
AFOSH	Air Force Occupational Safety and Health
AGE	aerospace ground equipment
AGL	above ground level
AVAQMD	Antelope Valley Air Quality Management District
AVEK	Antelope Valley-East Kern
BASH	bird/aircraft strike hazard
BLM	Bureau of Land Management
Cal-OSHA	California Occupational Safety and Health Administration
CDFG	California Depart of Fish and Game
CDP	Census designated place
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
dB	decibel
dBA	A-weighted decibels
dBC	C-weighted decibels
DFRC	Dryden Flight Research Center
DNL	day-night average noise level (also L_{dn})

DoD	Department of Defense
EA	environmental assessment
EIAP	Environmental Impact Analysis Process
EMR	electromagnetic radiation
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FY	fiscal year
GAO	Government Accountability Office
GBUAB	Great Basin Unified Air Basin
GIS	geographic information system
GSE	ground support equipment
IFR	instrument flight rules
INRMP	Integrated Natural Resources Management Plan
IR	instrument route
JP-8	jet fuel
KCAPCD	Kern County Air Pollution Control District
kV	kilovolts
L_{dn}	day-night average noise level
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MILCON	military construction
MOA	Military Operation Area
MSL	mean sea level

1	NAS	National Airspace System
2	NASA	National Aeronautics and Space Administration
3	NAWS	Naval Air Warfare Station
4	NEPA	National Environmental Policy Act
5	NO_2	nitrogen dioxide
6	NTTR	Nellis Test and Training Range
	OSHA	Occupational Safety and Health Administration
7	PEL	permissible exposure limit
8	PIRA	Precision Impact Range Area
9	P.L.	Public Law
10	PM_{10}	particulate matter 10 microns or less in diameter
11	POL	petroleum, oil, and lubricant
12	POV	privately owned vehicle
13	psf	pounds per square foot
14	ROI	Region of Influence
15	SJVAPCD	San Joaquin Valley Air Pollution Control District
16	SO_2	sulfur dioxide
17	SUA	special use airspace
18		
19	TRACON	traffic control
20		
21	U.S.C.	United States Code
22	U.S. EPA	U.S. Environmental Protection Agency
23	USFWS	U.S. Fish and Wildlife Service
24		
25	VFR	visual flight rules
26	VOC	volatile organic compound
27	VR	visual routes

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A AIR QUALITY

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A.1 AIR QUALITY DATA

The national and state ambient air quality standards for the ROI are shown in Table A.1-1.

Table A.1-1

National and California Ambient Air Quality Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2) *	Annual Arithmetic Mean	0.030 ppm (56 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (338 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

* The Nitrogen Dioxide ambient air quality standard was amended on February 22, 2007, to lower the 1-hr standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

See footnotes on next page ...

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (02/22/07)

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

8. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: California Air Resources Board, www.arb.ca.gov/research/aqs/aaqs2.pdf, accessed on 8/30/07

Evaluating impacts to air quality in the ROI requires knowledge of (1) the types of pollutants being emitted, (2) emission rates of the pollutant source, (3) the proximity of project emission sources to other emission sources, (4) topography, and (5) local and regional meteorological conditions. The area of effect for emissions of inert pollutants (pollutants other than ozone and its precursors) is generally limited to a few miles downwind from the source. The area of effect for ozone generally extends much further

downwind. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after their release, and therefore, many miles from the source.

The U.S. EPA designates all areas of the United States as having air quality better than (attainment) or worse than (non-attainment) the NAAQS. The criteria for non-attainment designation vary by pollutant. An area is (1) in non-attainment for ozone if its NAAQS has been exceeded more than three discontinuous times in 3 years at a single monitoring station and an area is (2) in non-attainment for any other pollutant if its NAAQS has been exceeded more than once per year. Pollutants in an area are often designated as unclassified when there are insufficient ambient air quality data for the U.S. EPA to form a basis for attainment status. The CARB considers an area to be in non-attainment of a CAAQS for a particular pollutant if (1) the standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM_{10}, and visibility reducing particles have been exceeded or (2) the standards for the remaining pollutants have been equaled or exceeded.

Air quality regulations were first promulgated with the CAA. This Act established the NAAQS and delegated the enforcement of air pollution regulations to the states. In areas where the NAAQS are exceeded, the CAA requires preparation of a State Implementation Plan (SIP) that describes how a state will attain the standards within mandated time frames. The CAA Amendments revised the attainment planning process, basing new requirements and compliance dates for reaching attainment upon the severity of the air quality standard violation.

Federal conformity guidelines included in the CAA Amendments state that a federal agency cannot support an activity unless the agency determines that the activity will conform to the state's most recent SIP approved by the U.S. EPA within the region of the proposed action. These guidelines state that federally supported or funded activities must show that the proposed actions will not (1) cause or contribute to any new air quality standard violation in any area, (2) interfere with programs outlined in any SIP for maintenance of any standard, (3) increase the frequency or severity of any existing standard violation in any area, or (4) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. The activities proposed herein are considered exempt from this rule as long as there is no increase in emissions above the *de minimis* levels specified in the rule. Therefore, a screening to determine the applicability of the conformance guidelines was performed. Table A.1-2 presents the *de minimis* threshold levels presented in the conformity rule for non-attainment areas.

Table A.1-2

Conformity Analysis *De Minimis* Thresholds

Pollutant	Degree of Non-attainment	*De Minimis* Level (tons/year)
Nonattainment Areas		
Ozone (VOCs or NO_2)	Serious	50
	Severe	25
	Extreme	10
	Marginal and Moderate (outside an ozone transport region)	100
	Marginal and Moderate (inside an ozone transport region)	50 (VOC) 100 (NO_2)
CO	All	100
PM_{10}	Moderate	100
	Serious	70
SO_2 or NO_2	All	100
Lead	All	25

Notes: CO – carbon monoxide, NO_x – nitrogen oxides, NO_2 – nitrogen dioxide, SO_2 – sulfur dioxide, VOC – volatile organic compound.

Source: 40 CFR, Chapter I, Subchapter C, Part 51.853, last updated July 2003

Ensuring reasonably foreseeable direct and indirect emissions do not exceed the *de minimis* thresholds comprises only half of the screening process. In addition to this requirement, a federal action must also not be considered regionally significant. A regionally significant action is defined as a federal action for which direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emissions inventory for that pollutant.

If a federal action meets both of the abovementioned criteria, it is exempt from further conformity analysis pursuant to 40 CFR Part 93.153. However, although an action may be considered exempt, should it be altered in any way that causes an increase in the reasonably foreseeable emissions, or if attainment areas are reclassified based on changes to NAAQS or the EPA-approved SIP, a revision to the conformity analysis may be required.

The impact on visibility from air pollutant emission sources is an issue with regard to federally mandated Class 1 areas, such as national parks and wilderness areas, where any appreciable deterioration in air quality is considered significant.

Areas in attainment with the NAAQS are regulated under the Prevention of Significant Deterioration (PSD) program authorized by the CAA Part C, Sections 160–169. PSD areas require owners and/or operators of new or modified sources to obtain a PSD permit prior to construction of a major source (40 CFR Part 5221) in attainment or unclassified areas. A major source is defined by PSD regulations as being a specific type of source listed by the U.S. EPA that has a potential of emitting 100 tons per year of a regulated pollutant. Potential to emit is based on the maximum design capacity of a source and takes into account pollution control efficiency. If the U.S. EPA does not list a source, it may still be considered major if it has the potential to emit 250 tons per year of a regulated pollutant.

Climate in R-2515 and Edwards AFB

The climate of the restricted area R-2515 is expected to be much the same as that of Edwards AFB. Hot summers, cool winters, low rainfall, large diurnal ranges in temperature, and abundant sunshine characterize the climate at Edwards AFB. The arid climate of the region is mainly due to rainshadow effects of the Sierra Nevada and San Gabriel Mountains; the prevailing westerly winds deposit most of their moisture on the western slopes of these mountain ranges. Data collected at Edwards AFB from 1979 to 1989 are used to describe the climate of the project region (National Oceanic and Atmospheric Administration 2001).

The dominant weather feature in the project region is the Eastern Pacific high-pressure system. This system is most prevalent during the summer, when it occupies a northern position over the Pacific Ocean. Concurrent with the presence of high pressure, a low-level, thermal low-pressure system persists over the desert regions due to intense surface heating. The relative strengths and positions of the high-pressure system and the interior thermal trough are largely responsible for the general climatic conditions of the region.

Precipitation

During the winter, the Eastern Pacific high-pressure system weakens and moves southward, allowing polar storm systems to migrate through the region. Although the systems that reach the region have dried out considerably after traversing the elevated terrain to the west, they are responsible for most of the annual precipitation in the area. The average annual precipitation at Edwards AFB is 4.9 inches. Rainfall

during the summer usually occurs from thunderstorms. Moisture from these storms originates from tropical air masses that move into the region from the south-southeast. Snow can occur in the region, although the average total is only about 2 inches per year.

Temperature

The annual average temperature at Edwards AFB is 62 degrees Fahrenheit (°F). Daily mean high and low temperatures for January are 57° F and 31° F, respectively. Daily mean high and low temperatures for July are 98° F and 66° F, respectively. Extreme temperatures that occurred during the 10-year monitoring period ranged from 4° F to 113° F.

Prevailing Winds

The combination of the Eastern Pacific high-pressure system over the Pacific Ocean and the thermal low over the interior desert produces a prevailing southwest wind in the region. Strong winds occur during the spring and summer, when the pressure gradient between the offshore Pacific High and the interior thermal trough is the greatest. However, extreme wind gusts can also occur with thunderstorms. Calm conditions increase during the fall and winter, when cold continental air replaces the thermal low and produces weak pressure gradients.

Elevated levels of PM_{10} are primarily associated with fugitive dust, which is produced through a combination of high winds, dry soil conditions resulting from an arid climate, and ground-disturbing activities such as mining, agriculture, and construction.

Regulatory Setting

In California, the CARB is responsible for enforcing air pollution regulations. The CARB has, in turn, delegated the responsibility of regulating stationary emission sources to local air agencies. Edwards AFB extends into Kern, San Bernardino, and Los Angeles counties within the Mojave Desert Air Basin and is located within the jurisdiction of three local air districts: Kern County APCD, Mojave Desert AQMD, and Antelope Valley APCD. The MDAB is impacted by both ozone and fugitive dust emissions. The attainment status for KCAPCD is shown in Table A.1-3.

Table A.1-3

Federal Standards Attainment Status for Pollutants in Areas of the KCAPCD

Pollutant	Federal Standards		
	KCAPCD	Kern River/Cummings Valleys	Indian Wells Valley[b]
Ozone–1-hour	Attainment/Maintenance		
Ozone–8-hour	Subpart 1 Nonattainment		Unclassified/Attainment
PM_{10}	Unclassified/Attainment	Attainment[a]	Attainment/Maintenance
$PM_{2.5}$	Unclassified/Attainment		
Carbon monoxide	Unclassified/Attainment		
Nitrogen dioxide	Unclassified		
Sulfur dioxide	Unclassified		
Lead particles	No designation		

Notes: a The Kern River and Cummings Valleys were previously included in the federally designated San Joaquin Valley PM_{10} *Serious* non-attainment area. EPA has proposed a determination of attainment 71 FR 40952, but the designation status in 40 CFR Part 81 remains serious non-attainment until CAA requirements for redesignation are met (maintenance plan approval).

b Federal designations fro PM_{10} and 8-hour ozone split the Indian Wells Valley out as a separate planning area from the rest of KCAPCD.

Source: Dave Jones, KCAPCD

The attainment status of the other air districts is shown in Table A.1-4. The area within the eastern portion of Kern County that is within the boundaries of the base, which is part of the KCAPCD and lies within the area of the Mojave Desert Air Basin is Subpart 1 nonattainment for the 8-hr ozone standard (NAAQS & CAAQS). Therefore, the analysis will include only the portion of Kern County within the MDAQMD.

In-flight aircraft/UAV emissions are generally unregulated within the project region, and are not considered for planning purposes above the 3,000 feet AGL mixing height. There are no stationary sources of emissions associated with the proposed project. The southern portion of Edwards AFB is located in the AVAQMD which is in non-attainment for ozone (NAAQS and CAAQS).

As stated in an entry to the *Federal Register* on April 22, 2004, and as shown in Table A.1-3, the KCAPCD region of Kern County is in attainment of the national 1-hour NAAQS for ozone, the standard was revoked on 15 Jun 05, but remains in non-attainment for both the 8-hour national standard and the state standard. Therefore, because the U.S. EPA has not outlined how the process of determining conformity will be applied to the 8-hour standard, the area is considered to be in attainment (maintenance) and the corresponding *de minimis* level was utilized when conducting the conformity analysis screening presented in Section 4.0.

Table A.1-4 shows the National and California Ambient Air Quality Standards attainment designations for the R-2508 Complex.

Table A.1-4

National/California Ambient Air Quality Standards

Attainment Designations for R-2508

County	Ozone	CO	NO_2	SO_2	PM_{10}
Kern County/MDAB[(a)]					
National	N/A[c]	U*	U*	U	N
California	N	U/A	A	A	U/N
Tulare County/SJVAB					
National	N	A	A	A	N
California	N	A	A	A	N
Fresno County/SJVAB					
National	N	A	A	A	N
California	N	A	A	A	N
Inyo County/GBVAB					
National	A	A	A	A	N
California	U	A	A	A	N
Los Angeles/MDAB					
National	N	U*	U*	U	U
California	N	A	A	A	N
San Bernardino County/ MDAB[(b)]					
National	N	U*	U*	U	N
California	N	A	A	A	N

Notes: Designation status: A=attainment, N=non-attainment, U=unclassified, and U*=unclassified/attainment.

a – With regard to the CAAQS for CO, the eastern portion of the county, located in the MDAB, is unclassified while the western portion of the county is in attainment. With regard to the NAAQS for PM_{10}, the entire county within the MDAB is unclassified for the federal standard, except the Searles Valley Planning Area, which is non-attainment.

b – With regard to the NAAQS for ozone, the southwestern portion of San Bernardino County within the MDAB is non-attainment, and the northwestern and eastern portions are considered unclassified/attainment. The area was recently determined to be in attainment for the 1-hour national ozone standard but remains in non-attainment of the 8-hour standard. Therefore, for the purpose of this screening process, the area was considered to remain in non-attainment for ozone.

c – The eastern portion of Kern County was recently re-designated as in attainment and is now in maintenance. Therefore, it was included in the conformity screening to ensure it conforms to the most recently U.S. EPA-approved SIP.

CO – carbon monoxide
MDAB – Mojave Desert Air Basin
NO_2 – nitrogen dioxide
PM_{10} – particulate matter equal to or less than 10 microns in diameter
SO_2 – sulfur dioxide

Source: California Air Resources Board 2003b. This information was supplemented with the latest information obtained from the *Federal Register*, April 22, 2004.

Sources of emissions shown in Table A-1.5 include:

- Privately owned vehicles of Air Force, NASA DFRC, or contractor personnel required for aircraft support;
- One takeoff and landing cycle (LTO) and one touch and go (TGO) for each aircraft flight operation;
- Aerospace ground equipment (AGE);
- Ground support equipment (GSE) used for loading and unloading systems (consisting of one light-duty gasoline vehicle, one light-duty gasoline truck, one heavy-duty gasoline truck, and one light-duty diesel truck); and
- Construction equipment. A detailed air emission summary for construction is shown in Table A-13.

Engine emission factors were multiplied by:

- The total number of operations expected to occur per test and evaluation event;
- The number of engines operating during a particular operation;
- The time in each engine mode and expected fuel flow for the particular operation; and
- The estimated amount of time the flights are expected to be below 3,000 feet AGL.

Table A-1.5

Conformity Applicability for Total Emission Sources 2008 -2014

	Emissions (tons/year)		
Year	**NO_x**	**VOCs**	**PM**
2008			
Aircraft Operations			
Aircraft[1]	19.1	5.8	0.52
Ground Support Equipment[2]	4.20	1.78	0.61
Government Owned Vehicles[3]	0.22	0.20	0.045
POV Travel	7.93	10.11	1.88
Construction			
AGE	0.78	0.10	0.04
Commuting	0.38	0.38	0.02
Construction	3.0	0.4	27.00
Total	**35.61**	**18.77**	**30.12**
2009			
Aircraft Operations			
Aircraft[1]	19.1	5.8	0.52
Ground Support Equipment[2]	4.20	1.78	0.61
Government Owned Vehicles[3]	0.22	0.20	0.045
POV Travel	7.93	10.11	1.88
Construction			
AGE	0.78	0.10	0.04
Commuting	0.38	0.38	0.02
Construction	3.0	0.4	27.00
Total	**35.61**	**18.77**	**30.12**
2010			
Aircraft Operations			
Aircraft[1]	19.1	5.8	0.52
Ground Support Equipment[2]	4.20	1.78	0.61
Government Owned Vehicles[3]	0.22	0.20	0.045
POV Travel	7.93	10.11	1.88
Construction			
AGE	0.78	0.10	0.04
Commuting	0.38	0.38	0.02
Construction	3.6	0.4	11.10
Total	**36.21**	**18.77**	14.22
2011-2014 (each year)			
Aircraft[1]	19.1	5.8	0.52
Ground Support Equipment[2]	4.20	1.78	0.61
Government Owned Vehicles[3]	0.22	0.20	0.045
POV Travel	7.93	10.11	1.88
Construction	**0**	**0**	**0**
(none projected for 2011 – 2014)			
Total	**31.45**	**17.89**	**3.06**

Table A-1.5, Page 1 of 2

Table A-1.4 (Continued)

Conformity Applicability for Total Emission Sources 2008 -2014

Year	Emissions (tons/year) NO_X	VOCs	PM
De minimis threshold AVAQMD	25	25	N/A
De minimis threshold KCAPCD	50	50	N/A
Percent of De minimis threshold[4,5]			
Year 2008	71.2	37.6	30.1
Year 2009	71.2	37.6	30.1
Year 2010	72.4	37.6	14.2
Year 2011 -2014	63	35.8	3.1
AVAQMD inventory[b]	10,220	12,775	N/A
Kern County MDAB portion of inventory[c]	10,950	4,380	N/A
Percent of inventory[d]			
Year 2008	0.003	0.0043	N/A
Year 2009	0.003	0.0043	N/A
Year 2010	0.003	0.0043	N/A
Year 2011 - 2014	0.003	0.0041	N/A

Table A-1.5, Page 2 of 2

Notes:

1 Based on the number of flights shown in Table 2-1.

2 Based on 12 LDGT and 12 LDGV vehicles traveling 50 miles per day and 12 LDDT vehicles traveling 20 miles per day 250 days per year.

3 Based on source emissions from aerospace ground equipment (AGE) supporting 25 aircraft and 2,000 operations per year.

4 Because flight would take off from the runway located within the KCAPCD the *de minimis* values are based on KCAPCD thresholds.

5 The federal *de minimis* value for PM_{10} of 100 tons/year for the Trona and San Bernardino County which are moderate non-attainment for PM_{10}.

a Does not include emissions above 3,000 feet AGL.

b Expected inventory based on 1994 California SIP and CARB 2000 estimated average annual emission.

c Inventory for 2005 based on CARB 2005 Almanac Data (Cal/EPA 2005).

d Percentage of inventory is based on the lowest value for KCAPCD (MDAB portion) and AVAQMD.

N/A not applicable

NA not available

NO_x nitrogen oxides

PM_{10} particulate matter 10 microns or less in diameter

VOC volatile organic compound

Emissions generated by these sources would be unavoidable; however, based on the evaluation of the emission levels as shown in Table A-1.5 they would be less than significant as compared to the *de minimis* levels for the different air districts where the aircraft would operate and where construction would occur. Tables A-1 – A-12 provide details of Table A-1.5.

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APPENDIX A-1 - Data Input and Results

Edwards AFB
New Mission Emissions Estimater - Kern County

Cells for data input are highlighted in yellow with bold border

Manpower Positions	Total	Filled From Existing People %	Filled From Existing People Number	New Employees %	New Employees Number	Days Absent: Vacation Days/Yr	Vacation %	Sick Days/Yr	Sick %	TDY/Travel Days/Yr	TDY/Travel %
Military	375	0%	0	100%	375	20	8%	5	2%	20	8%
Civilian	1,125	0%	0	100%	1,125	24	10%	10	4%	5	2%

Aircraft Type	No. of Acft	Sorties/Yr per Acft	Tot Annual Sorties
F-16	12	100	1,200
F-15	3	50	150
F-22	5	50	250
T-38 (A-10)	5	80	400
Tot Aircraft	**25**	**Tot Sorties**	**2,000**

Car Pool Factor: Persons/car	1.2

Number/type of aircraft and estimated annual sorties/year per aircraft must come from proponent based on number of aircraft and estimated operational useage. If other aircraft than those in this example are used, the emissions calculation pages must be changed to correspond.

In emissions calculations pages, it is assumed 1 landing/takeoff cycle (LTO) and 1 touch and go (TGO) per sortie. TGO estimate is based on several years of AFTO 781 data taken from Edwards AFB flight records database, but may be changed for a new mission if proponent provides a different rate of TGO per sortie.

Gov Vehicles	Number	Miles/Day/Veh	days/yr	TotMiles/Yr
Pickup (LDGT1)	12	50	250	150,000
Van(LDDT)	12	20	250	60,000
Auto (LDGV)	12	50	250	150,000
		Tot GOV Miles/Yr		**360,000**

Tactical Support Equipment	*See Tot Kern Co Gnd Emissions Page*

TOTAL KERN CO EMISSIONS FROM ABOVE DATA INPUTS			
Emissions Source	**Nox (tpy)**	**VOC (tpy)**	**PM (tpy)**
All Ground Sources	12.3	12.1	2.53609
All Aircraft Flight Operations	19.1	5.8	0.51506
Total Program Emissions	**31.4**	**17.9**	**3.051**

Critical Assumptions

Operating Days per year - 250 (365days, minus 104 weekend days, minus 11 holidays)

POV Calculations (See POV Miles and Mil Personnel Dist Tabs for details):
1. Distribution of MFH (family housing) vs dorm residents (based on proponent information)
2. Distribution of on-base vs off-base family residents (based on FM pay addresses)
3. Distribution of residency by county (based on FM pay addresses)
4. Calculation of personal miles driven by dependents based on each family having another car at home used for daily driving (estimate).
5. Emissions only calculated for miles driven (no engine starts or emissions while parked).

TSE Calculations - Emissions included in "All Ground Sources" (See Kern Co Gnd Emissions Calcs for details)
1. Annual hours of use per unit of powered AGE

APPENDIX A-2 Kern County Ground Emissions

Vehicle and Aerospace Ground Equipment (AGE) Emissions
Kern County APCD Only

Veh or Equipment Type	No. of Units	Hrs, or Gal/Unit	Emission Factor			Power (hp)	Fuel Flow (gal/hr)	Annual Miles, Hrs, or Gal	Unit of Calculation	Total Emissions per Year (tons)		
			NOx	VOC	PM					NOx	VOC	PM
LDGV (POV)	n/a	n/a	0.0011	0.0013	0.0002	n/a	n/a	15,080,712	Mile	7.93	10.11	1.877549
LDGV (GOV)	n/a	n/a	0.0011	0.0013	0.0002	n/a	n/a	150,000	Mile	0.08	0.10	0.018675
LDGT1 (GOV)	n/a	n/a	0.0013	0.0015	0.0002	n/a	n/a	60,000	Mile	0.04	0.04	0.00747
LDDT (GOV)	n/a	n/a	0.0013	0.0008	0.0002	n/a	n/a	150,000	Mile	0.10	0.06	0.018675
								SubTotal, Vehicles		**8.14**	**10.31**	**1.922369**
Hyd Test Stand[1] Diesel (A/M27T-13)	1	1,600	0.18	0.28	0.08	98	n/a	1,600	Hp-Hour	0.14	0.22	0.064
Air Conditioner Diesel (MA-3D)	1	928	0.64	0.06	0.28	110	n/a	928	Hp-Hour	0.30	0.03	0.12992
Gen Set Diesel (A/M32A-86D)	1	928	6.08	0.21	0.09	148	n/a	928	Hp-Hour	2.82	0.10	0.04176
Air Start Cart JP-8 (M32A-95)	1	928	1.47	0.07	0.11	155	n/a	928	Hp-hour	0.68	0.03	0.05104
Light Cart[2] Diesel (NF-2)	1	4,000	0.05	0.02	0.16	8	n/a	4,000	Hp-Hour	0.10	0.04	0.32
Tow Tractor Diesel	1	200	1.54	0.17	0.07	80	n/a	200	Hp-Hour	0.15	1.36	0.007
								SubTotal, AGE		**4.20**	**1.78**	**0.61372**
								Total Gnd Sources Emissions (Tons/Yr)		**12.34**	**12.09**	**2.536089**

Notes:

Emission factors for the AGE were derived from an Air Force Study dated October 2002.
Types of AGE and usage hours based on Table 3-1 in Study.

1 PM emission factor was not available for the Hydraulic Test Stand listed, so the EF for a similar piece of equipment was used.

2 PM emission factor was not available for the Light Cart listed, so the EF for a similar piece of equipment was used.

APPENDIX A-3 Privately Owned Vehicles Miles

Residence based on AFFTC/FM mailing address records for pay.

Personal Operated Vehicle (POV) Miles (Kern County APCD)

Commuting Miles Calculations (250 Days/Yr)

Category		Number of Persons	Occupancy per Vehicle	No Vehicles/ Day	Miles/Day Each Vehicle	Total Miles per Day
Civilian	County Residents	424.4	1.2	353.6	50	17,681
	Drive-through	498.2	1.2	415.1	40	16,605
Military (Off Base)	County Residents	37.3	1.2	31.1	50	1,556
	Drive-through	43.8	1.2	36.5	40	1,461
Military (On Base)	Family Housing	124.9	1.2	104.1	10	1,041
	Dormitory	101.5	1.0	101.5	6	609
				Total/Day		38,952
				Total Commuting POV Miles/Yr		9,738,032

County Residence Distribution

People	Total	Kern 46%	Los Angeles 45%	San Bernadino 9%
Military (Off Base)	81.2	37.3	36.5	7.3
Civilian	922.5	424.4	415.1	83.0

From Civ Personnel and Mil Personnel pages, respectively

Personal Miles Calculations (365 Days/Yr, 1 Trip/Day)

Category	Number	Miles/Day	Miles/Yr		Tot Miles per Year
Civilian	424.4	29	10585		4,491,745
Military (Off Base)	37.3	29	10585		395,183
Military (On Base)	124.9	10	3650		455,752
			Total Personal POV Miles/Yr		5,342,680

Total All POV Miles	**15,080,712**

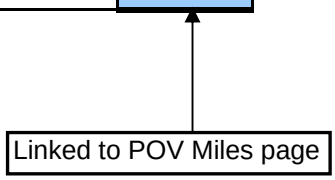
Personally Operated Vehicles (POV) Miles (Los Angeles County)

People	Number	Occupancy per vehicle	No Trips	Miles/trip	Miles per Day
Military	36.5	1.2	30.4	40	1,217
Civilian	415.1	1.2	345.9	40	13,838
			Total/Day		15,055
			Total POV Miles/Yr		**3,914,279**

APPENDIX A-4 Civilian Work Force Calculations

Daily Workforce Analysis

	Percent	No.
New Civilian Positions		1125
New People	100%	1125
Less Daily Absence Factor		
Vacation	8%	90
Sick	2%	23
Deployed	8%	90
Daily Civilian Workforce		**923**



APPENDIX A-5 Military Workforce Calculations

Daily Workforce Analysis

	Percent	No.
New Military Positions		375
New People	100%	375
Less Daily Absence Factor		
Vacation	8%	30
Sick	2%	8
Deployed	8%	30
Daily Military Workforce		**308**

Current Assigned Military Residence

Source: Pay address zip codes from AFFTC/FMFC

	No.	%
Tot Military	3630	
on base	2200	61%
off base	1430	39%

NOTE
Cell colors correspond to linked data cells on POV Miles Page

Adjust total daily work force for living location

Living Location Calculation

Housing Type	%	Number		%	Number
Family	67%	206.0	On Base	61%	124.9
			Off Base	39%	81.2
Dormitory	33%	101.5			

Linked to POV Miles page

Must be provided by proponent based on estimate of age and makeup of military workforce

APPENDIX A-6 Estimating Government Vehicle Miles

Government Operated Vehicle (GOV) Miles

Vehicle Type	Emission Code	Number of Vehicles	Miles per Day (each)	Miles per Day	Miles per Year
Pickup Truck	LDGT1	12	50	600	150,000
Van	LDDT	12	20	240	60,000
Automobile	LDGV	12	50	600	150,000
				Tot GOV Miles/Yr	**360,000**

Note:

1. Assumed 250 days

APPENDIX A-7 Emission Factors for Vehicles

Emission Factors for Vehicles

Calendar Year		VOC	CO	NOx
2012		grams/mile		
	LDGV	0.608	7.57	0.477
Emission Factor	pound/mile	0.0013	0.0167	0.0011
	LDGT1	0.66	8.22	0.593
Emission Factor	pound/mile	0.0015	0.0181	0.0013
	LDDT	0.372	0.657	0.586
Emission Factor	pound/mile	0.0008	0.0014	0.0013

Source: Mobile6 2007

Conversion Factor

1 gram = 0.00220462262 pound

APPENDIX A-8 Aircraft Emission Summary

Aircraft	NOx - tons	VOC - tons	PM - tons
F-16	11.2	1.9	0.3084
F-15	2.8	0.5	0.0771
F-22 (Use F-15)	4.7	0.8	0.1285
T-38 (A-10)	0.3	2.7	0.0011
Total Program Emissions	19.1	5.8	0.5151

APPENDIX A-9 F-16 Emission Calculations

			Aircraft Type		**F-16**													
Aircraft Activity and Emissions for Edwards AFB												**EMISSIONS (tons)**						
AIRCRAFT	**ENGINE**	**NUMBER OF**	**OPERATION**	**MODE OF**	**FUEL FLOW**	**EMISSIONS FACTOR (lb/1000lb Fuel)**						**OPERATION**	**NUMBER**	**TIME IN MODE**	**EMISSIONS**				
TYPE	**TYPE**	**ENGINES**	**CYCLE**	**OPERATION**	**(lb/min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**		**CYCLE**	**OPs**	**(min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**
F-16	F100-220	1	LTO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34		LTO	1,200	1.00	0.01	2.86	0.10	0.11	0.04
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47				1.00	0.01	0.50	0.08	0.05	0.02
				Approach	50.00	1.90	6.70	5.80	1.00	0.27				5.00	0.29	1.01	0.87	0.15	0.04
				Idle (Taxi-in)	17.33	3.20	3.30	24.00	1.00	0.12				15.00	0.50	0.51	3.74	0.16	0.02
				Idle (Taxi-out)	17.33	3.20	3.30	24.00	1.00	0.12				25.00	0.83	0.86	6.24	0.26	0.03
				Afterburner	862.17	0.01	3.10	4.00	1.00	0.15				1.00	0.01	1.60	2.07	0.52	0.08
			TGO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34		TGO	1,200	1.00	0.01	2.86	0.10	0.11	0.04
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47				0.50	0.00	0.25	0.04	0.03	0.01
				Approach	50.00	1.90	6.70	5.80	1.00	0.27				4.00	0.23	0.80	0.70	0.12	0.03
												EMISSIONS (tpy)			1.88	11.25	13.93	1.49	0.31

APPENDIX A-10 F-15 Emission Calculations

			Aircraft Type		**F-15**													
Aircraft Activity and Emissions for Edwards AFB												**EMISSIONS (tons)**						
AIRCRAFT	**ENGINE**	**NUMBER OF**	**OPERATION**	**MODE OF**	**FUEL FLOW**	**EMISSIONS FACTOR (lb/1000lb Fuel)**						**OPERATION**	**NUMBER**	**TIME IN MODE**		**EMISSIONS**			
TYPE	**TYPE**	**ENGINES**	**CYCLE**	**OPERATION**	**(lb/min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**		**CYCLE**	**OPs**	**(min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**
F-15	F100-220	2	LTO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34		LTO	150	1.00	0.00	0.71	0.02	0.03	0.01
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47				1.00	0.00	0.13	0.02	0.01	0.01
				Approach	50.00	1.90	6.70	5.80	1.00	0.27				5.00	0.07	0.25	0.22	0.04	0.01
				Idle (Taxi-in)	17.33	3.20	3.30	24.00	1.00	0.12				15.00	0.12	0.13	0.94	0.04	0.00
				Idle (Taxi-out)	17.33	3.20	3.30	24.00	1.00	0.12				25.00	0.21	0.21	1.56	0.06	0.01
				Afterburner	862.17	0.01	3.10	4.00	1.00	0.15				1.00	0.00	0.40	0.52	0.13	0.02
			TGO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34		TGO	150	1.00	0.00	0.71	0.02	0.03	0.01
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47				0.50	0.00	0.06	0.01	0.01	0.00
				Approach	50.00	1.90	6.70	5.80	1.00	0.27				4.00	0.06	0.20	0.17	0.03	0.01
			EMISSIONS (tpy)									**EMISSIONS (tpy)**			**0.47**	**2.81**	**3.48**	**0.37**	**0.08**

APPENDIX A-11 F-22 Emission Calculations

Aircraft Type F-22 (Use F-15)
Aircraft Activity and Emissions for Edwards AFB

AIRCRAFT TYPE	ENGINE TYPE	NUMBER OF ENGINES	OPERATION CYCLE	MODE OF OPERATION	FUEL FLOW (lb/min)	EMISSIONS FACTOR (lb/1000lb Fuel) ROGs	NOx	CO	SOx	PM	OPERATION CYCLE	NUMBER OPs	TIME IN MODE (min)	EMISSIONS (tons) ROGs	NOx	CO	SOx	PM
F-22 (Use F-15)	F100-220	2	LTO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34	LTO	250	1.00	0.00	1.19	0.04	0.04	0.01
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47			1.00	0.00	0.21	0.03	0.02	0.01
				Approach	50.00	1.90	6.70	5.80	1.00	0.27			5.00	0.12	0.42	0.36	0.06	0.02
				Idle (Taxi-in)	17.33	3.20	3.30	24.00	1.00	0.12			15.00	0.21	0.21	1.56	0.06	0.01
				Idle (Taxi-out)	17.33	3.20	3.30	24.00	1.00	0.12			25.00	0.35	0.36	2.60	0.11	0.01
				Afterburner	862.17	0.01	3.10	4.00	1.00	0.15			1.00	0.00	0.67	0.86	0.22	0.03
			TGO	Take Off	176.33	0.10	27.00	0.90	1.00	0.34	TGO	250	1.00	0.00	1.19	0.04	0.04	0.01
				Climb Out	85.17	0.10	9.80	1.60	1.00	0.47			0.50	0.00	0.10	0.02	0.01	0.01
				Approach	50.00	1.90	6.70	5.80	1.00	0.27			4.00	0.10	0.34	0.29	0.05	0.01
				EMISSIONS (tpy)							**EMISSIONS (tpy)**			**0.78**	**4.69**	**5.80**	**0.62**	**0.13**

APPENDIX A-12 A-10 Emission Calculations

			Aircraft Type		**T-38 (A-10)**													
Aircraft Activity and Emissions for Edwards AFB											**EMISSIONS (tpy)**							
AIRCRAFT	**ENGINE**	**NUMBER OF**	**OPERATION**	**MODE OF**	**FUEL FLOW**	**EMISSIONS FACTOR (lb/1000lb Fuel)**					**OPERATION**	**NUMBER**	**TIME IN MODE**	**EMISSIONS**				
TYPE	**TYPE**	**ENGINES**	**CYCLE**	**OPERATION**	**(lb/min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**	**CYCLE**	**OPs**	**(min)**	**ROGs**	**NOx**	**CO**	**SOx**	**PM**
T-38 (A-10)	J85-5A	2	LTO*	Take Off	43.83	0.80	2.60	29.00	1.00	0.01	LTO	400	1.00	0.01	0.05	0.51	0.02	0.0002
				Climb Out	24.33	3.50	2.30	43.00	1.00	0.01			1.00	0.03	0.02	0.42	0.01	0.0001
				Approach	16.67	6.40	1.80	73.60	1.00	0.01			5.00	0.21	0.06	2.45	0.03	0.0003
				Idle (Taxi-in)	7.50	30.00	1.30	178.00	1.00	-			10.00	0.90	0.04	5.34	0.03	0.0000
				Idle (Taxi-out)	7.50	30.00	1.30	178.00	1.00	-			15.00	1.35	0.06	8.01	0.05	0.0000
			TGO**	Take Off	43.83	0.80	2.60	29.00	1.00	0.01	TGO*	400	1.00	0.01	0.05	0.51	0.02	0.0002
				Climb Out	24.33	3.50	2.30	43.00	1.00	0.01			0.50	0.02	0.01	0.21	0.00	0.0000
				Approach	16.67	6.40	1.80	73.60	1.00	0.01			4.00	0.17	0.05	1.96	0.03	0.0003
			EMISSIONS (tpy)								**EMISSIONS (tpy)**			2.71	0.33	19.41	0.18	0.0011

Construction Emissions

The attached table (A-13) are extracted from the *Draft Base Realignment and Closure EA for Realignment of Nellis AFB*. The data shows the air emissions for the construction phases that could occur if the Proposed Action were implemented and construction of approximately 136,150 square feet of new facilities were to occur. Actual values may differ by up to 10 percent without creating any new level of significance.

BRAC
FY07

F-15C Aggressor Squadron Ops 13,740 SF
Site prep (grading, compacting, drainage, etc.) 187,300 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	45	98	0.21	0.99	3.49	6.9	0.85	0.722	48.51	171.01	338.11	41.65	35.38
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.81	42.11	53.54	9.52	4.58
Dump truck (12 CY)	32	1	45	275	0.21	0.68	2.7	8.38	0.89	0.402	124.67	495.01	1536.37	163.17	73.70
										Subtotal	224.33	880.20	2462.07	273.61	139.28

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	7	250	0.21	0.68	2.7	8.38	0.89	0.402	2.20	8.75	27.16	2.88	1.30
Dump truck	6	1	3	275	0.21	0.68	2.7	8.38	0.89	0.402	1.56	6.19	19.20	2.04	0.92
Delivery truck	6	6	3	180	0.21	0.68	2.7	8.38	0.89	0.402	6.12	24.30	75.42	8.01	3.62
Backhoe/loader	1	8	3	98	0.21	0.99	3.49	6.9	0.85	0.722	1.08	3.80	7.51	0.93	0.79
Small generator	2	2	16	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.46	2.50	3.17	0.56	0.27
										Subtotal	11.64	46.50	134.75	14.80	7.09

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	3	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.17	0.94	1.19	0.21	0.10
Delivery truck	1	2	7	180	0.21	0.68	2.7	8.38	0.89	0.402	0.79	3.15	9.78	1.04	0.47
Skid steer loader	2	4	10	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.42	6.43	15.22	2.53	1.29
Dump truck	2	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	0.35	1.38	4.27	0.45	0.20
Crane	1	8	7	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.16	5.52	36.01	5.92	1.78
										Subtotal	4.89	17.41	66.46	10.16	3.84

Aircraft Maintenance Unit 17,370 SF
Site prep (grading, compacting, drainage, etc.) 196,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	lb	lb	lb	lb	lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	47	98	0.21	0.99	3.49	6.9	0.85	0.722	50.67	178.61	353.13	43.50	36.95
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	47	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	8.16	43.98	55.92	9.94	4.78
Dump truck (12 CY)	32	1	47	275	0.21	0.68	2.7	8.38	0.89	0.402	130.21	517.01	1604.65	170.42	76.98
										Subtotal	232.37	911.67	2547.76	283.14	144.33

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	9	250	0.21	0.68	2.7	8.38	0.89	0.402	2.83	11.25	34.92	3.71	1.68
Dump truck	4	1	6	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	6	180	0.21	0.68	2.7	8.38	0.89	0.402	12.24	48.60	150.84	16.02	7.24
Backhoe/loader	1	8	6	98	0.21	0.99	3.49	6.9	0.85	0.722	2.16	7.60	15.03	1.85	1.57
Small generator	2	2	31	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.90	4.83	6.15	1.09	0.53
										Subtotal	20.63	82.47	237.11	26.15	12.62

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	23	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.26	14.79	35.00	5.81	2.96
Dump truck	2	1	5	275	0.21	0.68	2.7	8.38	0.89	0.402	0.87	3.44	10.67	1.13	0.51
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	8.46	32.39	108.36	16.15	6.61

Hangar - 4 Bay 23,940 SF
Site prep (grading, compacting, drainage, etc.) 47,880 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92

Backhoe/loader	3	8	11	98	0.21	0.99	3.49	6.9	0.85	0.722	11.86	41.80	82.65	10.18	8.65
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	11	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.91	10.29	13.09	2.33	1.12
Dump truck (12 CY)	32	1	11	275	0.21	0.68	2.7	8.38	0.89	0.402	30.47	121.00	375.56	39.89	18.02
										Subtotal	58.20	228.50	643.25	71.48	36.03

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	16	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.13	5.14	12.17	2.02	1.03
Concrete truck	5	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	3.94	15.63	48.50	5.15	2.33
Dump truck	6	1	6	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	1	1	34	180	0.21	0.68	2.7	8.38	0.89	0.402	1.93	7.65	23.74	2.52	1.14
Backhoe/loader	1	8	6	98	0.21	0.99	3.49	6.9	0.85	0.722	2.16	7.60	15.03	1.85	1.57
Small generator	2	2	43	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.24	6.71	8.53	1.52	0.73
										Subtotal	13.51	55.10	146.38	17.14	8.64

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.04	5.61	7.14	1.27	0.61
Delivery truck	1	2	22	180	0.21	0.68	2.7	8.38	0.89	0.402	2.49	9.90	30.73	3.26	1.47
Skid steer loader	2	4	70	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	9.92	45.00	106.52	17.69	9.00
Concrete truck	4	2	10	250	0.21	0.68	2.7	8.38	0.89	0.402	6.30	25.00	77.59	8.24	3.72
Crane	1	8	11	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.39	8.68	56.58	9.31	2.80
										Subtotal	23.14	94.20	278.56	39.78	17.61

Fuel Cell Maintenance Hangar 18,200 SF

Site prep (grading, compacting, drainage, etc.) 36,400 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	8.62	30.40	60.11	7.40	6.29
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.39	7.49	9.52	1.69	0.81
Dump truck (12 CY)	32	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	22.16	88.00	273.13	29.01	13.10
										Subtotal	46.13	181.30	514.72	57.19	28.46

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	7	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.50	2.25	5.33	0.88	0.45
Concrete truck	4	1	9	250	0.21	0.68	2.7	8.38	0.89	0.402	2.83	11.25	34.92	3.71	1.68
Dump truck	7	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.42	9.63	29.87	3.17	1.43
Delivery truck	6	6	5	180	0.21	0.68	2.7	8.38	0.89	0.402	10.20	40.50	125.70	13.35	6.03
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	31	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.90	4.83	6.15	1.09	0.53
										Subtotal	18.29	73.53	211.99	23.44	11.16

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	6	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.35	1.87	2.38	0.42	0.20
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	23	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.26	14.79	35.00	5.81	2.96
Dump truck	2	1	12	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Crane	1	8	9	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.77	7.10	46.30	7.62	2.29
										Subtotal	10.04	38.31	128.83	18.65	7.62

Armament 19,000 SF

Site prep (grading, compacting, drainage, etc.) 88,800 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	8	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.57	2.57	6.09	1.01	0.51
Concrete truck	4	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	3.15	12.50	38.80	4.12	1.86
Dump truck	4	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	6	6	6	180	0.21	0.68	2.7	8.38	0.89	0.402	12.24	48.60	150.84	16.02	7.24
Backhoe/loader	1	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	2.87	10.13	20.04	2.47	2.10
Small generator	2	2	33	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.95	5.15	6.54	1.16	0.56
										Subtotal	22.55	89.95	256.45	28.41	13.91

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	7	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.40	2.18	2.78	0.49	0.24
Delivery truck	1	2	14	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	24	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.40	15.43	36.52	6.07	3.09
Dump truck	3	4	12	275	0.21	0.68	2.7	8.38	0.89	0.402	12.47	49.50	153.64	16.32	7.37

Crane	1	8	10	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.08	7.89	51.44	8.46	2.55
										Subtotal	20.94	81.30	263.93	33.42	14.18

Hush House slab 1333 CY

Site prep (grading, compacting, drainage, etc.) 8,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	10	98	0.21	0.99	3.49	6.9	0.85	0.722	10.78	38.00	75.13	9.26	7.86
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	10	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02
Dump truck (12 CY)	32	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	27.70	110.00	341.41	36.26	16.38
										Subtotal	54.17	212.77	600.41	66.72	33.51

Grading/Gravel

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Grader	2	4	9	135	0.58	0.68	2.7	8.38	0.93	0.402	8.45	33.56	104.15	11.56	5.00
Skid steer loader	2	6	9	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.91	8.68	20.54	3.41	1.74
Small generator	2	4	9	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.52	2.81	3.57	0.63	0.31
Dump truck	5	0.5	9	275	0.21	0.68	2.7	8.38	0.89	0.402	1.95	7.73	24.01	2.55	1.15
										Subtotal	12.83	52.78	152.27	18.16	8.19

Small diesel engines	4	3	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.56	8.42	10.71	1.90	0.92

Concrete Work

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	1	2	54	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.91	8.68	20.54	3.41	1.74
Concrete truck	3	1	63	250	0.21	0.68	2.7	8.38	0.89	0.402	14.88	59.06	183.32	19.47	8.79
Dump truck	2	0.5	36	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	4	1	18	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	2	2	36	98	0.21	0.99	3.49	6.9	0.85	0.722	6.47	22.80	45.08	5.55	4.72
										Subtotal	30.45	119.12	337.63	37.85	19.50

Flight Simulator 16,000 SF
Site prep (grading, compacting, drainage, etc.) 174,150 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	42	98	0.21	0.99	3.49	6.9	0.85	0.722	45.28	159.61	315.57	38.87	33.02
Grader	3	8	7	135	0.58	0.68	2.7	8.38	0.93	0.402	19.72	78.30	243.03	26.97	11.66
Small generator	3	8	42	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.29	39.30	49.97	8.89	4.28
Dump truck (12 CY)	32	1	42	275	0.21	0.68	2.7	8.38	0.89	0.402	116.36	462.01	1433.94	152.29	68.79
										Subtotal	209.44	821.81	2298.82	255.47	130.04

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	6	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	27	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.78	4.21	5.35	0.95	0.46
										Subtotal	15.40	61.86	177.14	19.64	9.43

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Dump truck	2	2	10	275	0.21	0.68	2.7	8.38	0.89	0.402	3.46	13.75	42.68	4.53	2.05
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	10.41	39.88	133.01	18.49	7.63

Addition for 926th Wing HQ 8,000 SF
Site prep (grading, compacting, drainage, etc.) 16,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	4	250	0.21	0.68	2.7	8.38	0.89	0.402	1.26	5.00	15.52	1.65	0.74
Dump truck	6	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.04	4.13	12.80	1.36	0.61
Delivery truck	6	6	2	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	13	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.38	2.03	2.58	0.46	0.22
										Subtotal	7.69	30.85	88.47	9.80	4.71

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	3	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.17	0.94	1.19	0.21	0.10

	Delivery truck	1	2	6	180	0.21	0.68	2.7	8.38	0.89	0.402	0.68	2.70	8.38	0.89	0.40
	Skid steer loader	2	4	10	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.42	6.43	15.22	2.53	1.29
	Dump truck	2	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
	Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
											Subtotal	5.23	20.10	66.70	9.28	3.83

Parking Pavement 70,000 SF

	Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
	Grader	1	4	5	135	0.58	0.68	2.7	8.38	0.93	0.402	2.35	9.32	28.93	3.21	1.39
	Roller	2	4	5	30	0.59	1.8	5	6.9	1	0.8	2.81	7.80	10.77	1.56	1.25
	Paver	1	8	5	107	0.59	0.68	2.7	8.38	0.93	0.402	3.79	15.03	46.65	5.18	2.24
	Concrete truck	4	3	12	250	0.21	0.68	2.7	8.38	0.89	0.402	11.33	45.00	139.67	14.83	6.70
	Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
	Small diesel engines	4	6	23	25	0.43	1.7	5	8.5	0.93	0.9	22.24	65.41	111.20	12.17	11.77
											Total	43.88	147.97	353.98	38.73	24.15

Volume of hot mix asphalt	23310 ft^3
Average density of HMA	145 lb/ft^3
CARB EF for HMA	0.04 lb/ton
VOC emissions from HMA paving	68 lb

Pavement Marking 2,100 LF

' Solid Line= 215 ft/gal VOC content of paint = 1.3 lb/gal

VOC lb
13

Demo

Armament/Engine 8,643 SF

Building demolition

	Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
	Dozer	2	8	6	90	0.59	0.99	3.49	6.9	0.93	0.722	11	39.22	77.54	10.45	8.11
	Skid steer loader	2	8	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2	7.71	18.26	3.03	1.54
											Subtotal	13	46.94	95.80	13.48	9.66

Demo debris removal

Equipment	Number	Hr/day	# days	Hp		VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Backhoe/loader	2	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	3	10.13	20.04	2.47	2.10
Skid steer loader	2	8	4	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1	5.14	12.17	2.02	1.03
Dump truck	8	2	4	275	0.21	0.68	2.7	8.38	0.89	0.402	6	22.00	68.28	7.25	3.28
										Subtotal	10	37.28	100.49	11.74	6.40

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total Tons	$PM_{2.5}/PM_{10}$ Ratio	$PM_{2.5}$ Total Tons	
0.42	9.6	200	27	0.1	3	833,173

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
82	250	6	0.001497	0.013925	0.001489	0	0.000080	184.13	1712.78	183.15	1.107	9.80
							Subtotal	184	1,713	183	1	10

Construction emissions in 2007 (t/yr):

VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
0.4	1.9	3.0	0.3	27.0	2.9

FY08

AGE Facility 6,900 SF

Site prep (grading, drainage, utilities etc.) 13,800 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	1	6	6	299	0.58	0.68	2.7	8.38	0.93	0.402	9.36	37.16	115.34	12.80	5.53
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Backhoe/loader	2	6	14	98	0.21	0.99	3.49	6.9	0.85	0.722	7.55	26.60	52.59	6.48	5.50
Small generator	1	4	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Dump truck	6	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	4.16	16.50	51.21	5.44	2.46
										Subtotal	24.47	96.24	253.55	30.48	16.40

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	6	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.43	1.93	4.57	0.76	0.39
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	6	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	27	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.78	4.21	5.35	0.95	0.46
										Subtotal	15.40	61.86	177.14	19.64	9.43

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.29	1.56	1.98	0.35	0.17
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Dump truck	1	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	0.87	3.44	10.67	1.13	0.51
Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
										Subtotal	6.58	26.41	80.42	11.71	5.08
Small diesel engines	2	2	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.30	7.02	8.92	1.59	0.76

Engine Shop 9,000 SF

Site prep (grading, drainage, utilities etc.) 18,000 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	1	6	8	299	0.58	0.68	2.7	8.38	0.93	0.402	12.48	49.55	153.79	17.07	7.38
Skid steer loader	2	4	26	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.68	16.72	39.56	6.57	3.34
Backhoe/loader	2	6	18	98	0.21	0.99	3.49	6.9	0.85	0.722	9.70	34.20	67.62	8.33	7.08
Small generator	1	4	26	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.75	4.05	5.16	0.92	0.44
Dump truck	6	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	5.19	20.63	64.02	6.80	3.07
										Subtotal	31.81	125.15	330.14	39.68	21.31

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	5	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.35	1.61	3.80	0.63	0.32
Concrete truck	4	1	5	250	0.21	0.68	2.7	8.38	0.89	0.402	1.57	6.25	19.40	2.06	0.93
Dump truck	7	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.21	4.81	14.94	1.59	0.72
Delivery truck	6	6	5	180	0.21	0.68	2.7	8.38	0.89	0.402	10.20	40.50	125.70	13.35	6.03
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	24	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.69	3.74	4.76	0.85	0.41
										Subtotal	14.75	59.45	173.61	19.09	8.93

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	7	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.40	2.18	2.78	0.49	0.24
Delivery truck	1	2	16	180	0.21	0.68	2.7	8.38	0.89	0.402	1.81	7.20	22.35	2.37	1.07
Skid steer loader	2	4	27	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.83	17.36	41.09	6.82	3.47
Dump truck	2	1	7	275	0.21	0.68	2.7	8.38	0.89	0.402	1.21	4.81	14.94	1.59	0.72
Crane	1	8	5	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.54	3.94	25.72	4.23	1.27
										Subtotal	8.80	35.50	106.87	15.51	6.77
Small diesel engines	2	2	60	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total Tons	$PM_{2.5}/PM_{10}$ Ratio	$PM_{2.5}$ Total Tons
0.42	0.7	75	0.8	0.1	0

POV Emissions from Construction Workers 15,900

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
12	100	6	0.001497	0.013925	0.001489	0	0.000080	10.78	100.26	10.72	0.0648	0.57
							Subtotal	11	100	11	0	1

Construction emissions in 2008 (t/yr):

VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
0.1	0.3	0.6	0.1	0.8	0.1

FY09

Airfield Pavement (inc. ramp) 375,000 SF

Site prep (grading, compacting, drainage, etc.)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	10	299	0.58	0.68	2.7	8.38	0.93	0.402	41.60	165.17	512.62	56.89	24.59
Backhoe/loader	3	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	97.02	342.03	676.21	83.30	70.76
Grader	3	8	15	135	0.58	0.68	2.7	8.38	0.93	0.402	42.26	167.79	520.77	57.79	24.98
Small generator	3	8	90	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	15.62	84.21	107.09	19.04	9.16
Dump truck (12 CY)	32	1	90	275	0.21	0.68	2.7	8.38	0.89	0.402	249.34	990.02	3072.73	326.34	147.40
										Subtotal	445.84	1749.22	4889.43	543.37	276.90

Concrete apron construction

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	4	4	90	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	25.50	115.72	273.90	45.50	23.14
Concrete truck (9 CY)	24	1	64	250	0.21	0.68	2.7	8.38	0.89	0.402	120.89	480.01	1489.81	158.23	71.47
Dump truck (12 CY)	2	0.5	24	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	2	1	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
Backhoe/loader	2	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	64.68	228.02	450.81	55.53	47.17
										Subtotal	215.53	841.45	2269.46	265.09	144.42

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total Tons	$PM_{2.5}/PM_{10}$ Ratio	$PM_{2.5}$ Total Tons
0.42	4.3	180	10.8	0.1	1

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
45	215	6	0.001497	0.013925	0.001489	0	0.000080	86.90	808.35	86.44	0.52245	4.62
							Subtotal	87	808	86	1	5

Construction emissions in 2009 (t/yr):

VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
0.4	1.7	3.6	0.4	11.1	1.3

Post BRAC

FY11

64th AGRS AMU/Hangar 17,370 SF

Site prep (grading, compacting, drainage, etc.) 196,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	lb	lb	lb	lb	lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	47	98	0.21	0.99	3.49	6.9	0.85	0.722	50.67	178.61	353.13	43.50	36.95
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	47	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	8.16	43.98	55.92	9.94	4.78
Dump truck (12 CY)	32	1	47	275	0.21	0.68	2.7	8.38	0.89	0.402	130.21	517.01	1604.65	170.42	76.98
										Subtotal	232.37	911.67	2547.76	283.14	144.33

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	14	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.99	4.50	10.65	1.77	0.90
Concrete truck	8	1	10	250	0.21	0.68	2.7	8.38	0.89	0.402	6.30	25.00	77.59	8.24	3.72
Dump truck	6	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	5.19	20.63	64.02	6.80	3.07
Delivery truck	1	1	32	180	0.21	0.68	2.7	8.38	0.89	0.402	1.81	7.20	22.35	2.37	1.07
Backhoe/loader	1	8	10	98	0.21	0.99	3.49	6.9	0.85	0.722	3.59	12.67	25.04	3.09	2.62
Small generator	2	2	55	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.59	8.58	10.91	1.94	0.93
										Subtotal	19.48	78.57	210.56	24.21	12.32

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	17	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.98	5.30	6.74	1.20	0.58
Delivery truck	1	2	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
Skid steer loader	2	4	65	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	9.21	41.79	98.91	16.43	8.36
Concrete truck	4	2	13	250	0.21	0.68	2.7	8.38	0.89	0.402	8.19	32.50	100.87	10.71	4.84
Crane	1	8	17	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	5.24	13.41	87.45	14.39	4.33
										Subtotal	25.99	102.45	323.30	45.85	19.51

AGE Facility 6,900 SF

Site prep (grading, drainage, utilities etc.) 13,800 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	1	6	6	299	0.58	0.68	2.7	8.38	0.93	0.402	9.36	37.16	115.34	12.80	5.53

Skid steer loader	2	4	20	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2.83	12.86	30.43	5.06	2.57
Backhoe/loader	2	6	14	98	0.21	0.99	3.49	6.9	0.85	0.722	7.55	26.60	52.59	6.48	5.50
Small generator	1	4	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Dump truck	6	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	4.16	16.50	51.21	5.44	2.46
										Subtotal	24.47	96.24	253.55	30.48	16.40

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM** g/hp-hr	**VOC** lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb
Skid steer loader	2	2	3	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.21	0.96	2.28	0.38	0.19
Concrete truck	4	1	4	250	0.21	0.68	2.7	8.38	0.89	0.402	1.26	5.00	15.52	1.65	0.74
Dump truck	6	1	2	275	0.21	0.68	2.7	8.38	0.89	0.402	1.04	4.13	12.80	1.36	0.61
Delivery truck	6	6	2	180	0.21	0.68	2.7	8.38	0.89	0.402	4.08	16.20	50.28	5.34	2.41
Backhoe/loader	1	8	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.72	2.53	5.01	0.62	0.52
Small generator	2	2	12	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.35	1.87	2.38	0.42	0.20
										Subtotal	7.66	30.69	88.27	9.77	4.69

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	2	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.12	0.62	0.79	0.14	0.07
Delivery truck	1	2	5	180	0.21	0.68	2.7	8.38	0.89	0.402	0.57	2.25	6.98	0.74	0.34
Skid steer loader	2	4	9	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.28	5.79	13.70	2.27	1.16
Dump truck	3	2	5	275	0.21	0.68	2.7	8.38	0.89	0.402	2.60	10.31	32.01	3.40	1.54
Crane	1	8	4	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	1.23	3.16	20.58	3.39	1.02
										Subtotal	5.79	22.13	74.06	9.94	4.11

64th AGRS Squad Ops 13,740 SF

Site prep (grading, compacting, drainage, etc.) 187,300 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	5	299	0.58	0.68	2.7	8.38	0.93	0.402	20.80	82.58	256.31	28.45	12.30
Backhoe/loader	3	8	45	98	0.21	0.99	3.49	6.9	0.85	0.722	48.51	171.01	338.11	41.65	35.38
Grader	3	8	8	135	0.58	0.68	2.7	8.38	0.93	0.402	22.54	89.49	277.74	30.82	13.32
Small generator	3	8	45	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	7.81	42.11	53.54	9.52	4.58
Dump truck (12 CY)	32	1	45	275	0.21	0.68	2.7	8.38	0.89	0.402	124.67	495.01	1536.37	163.17	73.70
										Subtotal	224.33	880.20	2462.07	273.61	139.28

Foundation (slab)

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	18	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.28	5.79	13.70	2.27	1.16
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	8	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	6	6	4	180	0.21	0.68	2.7	8.38	0.89	0.402	8.16	32.40	100.56	10.68	4.82
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	18	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.52	2.81	3.57	0.63	0.31
										Subtotal	16.68	67.06	193.02	21.75	10.46

Structure

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	10	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
Delivery truck	1	1	28	180	0.21	0.68	2.7	8.38	0.89	0.402	1.59	6.30	19.55	2.08	0.94
Skid steer loader	2	4	41	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	5.81	26.36	62.39	10.36	5.27
Dump truck	2	1	10	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
Crane	1	8	8	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	2.46	6.31	41.15	6.77	2.04
										Subtotal	12.17	48.96	148.40	22.18	9.61
Small diesel engines	2	2	78	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	2.26	12.16	15.47	2.75	1.32

Infrastructure - roads, utilities 70,000 SF

Grading/Gravel

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	2	6	17	135	0.58	0.68	2.7	8.38	0.93	0.402	23.95	95.08	295.10	32.75	14.16
Skid steer loader	3	4	17	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3.61	16.39	38.80	6.45	3.28
Small generator	3	4	17	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.48	7.95	10.11	1.80	0.87
Dump truck (12 CY)	5	0.5	25	275	0.21	0.68	2.7	8.38	0.89	0.402	5.41	21.48	66.68	7.08	3.20
										Subtotal	34.45	140.91	410.70	48.08	21.50
Small diesel engines	6	3	25	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.25	17.54	22.31	3.97	1.91

Parking Pavement 70,000 SF

Equipment	Number	Hr/day	# days	Hp	LF	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	1	4	5	135	0.58	0.68	2.7	8.38	0.93	0.402	2.35	9.32	28.93	3.21	1.39
Roller	2	4	5	30	0.59	1.8	5	6.9	1	0.8	2.81	7.80	10.77	1.56	1.25
Paver	1	8	5	107	0.59	0.68	2.7	8.38	0.93	0.402	3.79	15.03	46.65	5.18	2.24
Concrete truck	4	3	12	250	0.21	0.68	2.7	8.38	0.89	0.402	11.33	45.00	139.67	14.83	6.70
Delivery truck	1	2	12	180	0.21	0.68	2.7	8.38	0.89	0.402	1.36	5.40	16.76	1.78	0.80
Small diesel engines	4	6	23	25	0.43	1.7	5	8.5	0.93	0.9	22.24	65.41	111.20	12.17	11.77
										Total	43.88	147.97	353.98	38.73	24.15

Volume of hot mix asphalt	23,333	ft^3
Average density of HMA	145	lb/ft^3
CARB EF for HMA	0.04	lb/ton
VOC emissions from HMA paving	68	lb

Pavement Marking 2,800 LF

' Solid Line= 215 ft/gal VOC content of paint = 1.3 lb/gal

VOC lb
17

Armament 19,000 SF

Site prep (grading, compacting, drainage, etc.) 88,800 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	4	299	0.58	0.68	2.7	8.38	0.93	0.402	16.64	66.07	205.05	22.76	9.84
Backhoe/loader	3	8	20	98	0.21	0.99	3.49	6.9	0.85	0.722	21.56	76.01	150.27	18.51	15.72
Grader	3	8	4	135	0.58	0.68	2.7	8.38	0.93	0.402	11.27	44.74	138.87	15.41	6.66
Small generator	3	8	20	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.47	18.71	23.80	4.23	2.04
Dump truck (12 CY)	32	1	20	275	0.21	0.68	2.7	8.38	0.89	0.402	55.41	220.00	682.83	72.52	32.76
										Subtotal	108.35	425.54	1200.82	133.43	67.01

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	15	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Concrete truck	4	1	8	250	0.21	0.68	2.7	8.38	0.89	0.402	2.52	10.00	31.04	3.30	1.49
Dump truck	8	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	2.77	11.00	34.14	3.63	1.64
Delivery truck	1	1	15	180	0.21	0.68	2.7	8.38	0.89	0.402	0.85	3.38	10.48	1.11	0.50
Backhoe/loader	1	8	4	98	0.21	0.99	3.49	6.9	0.85	0.722	1.44	5.07	10.02	1.23	1.05
Small generator	2	2	15	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
										Subtotal	9.07	36.60	100.06	11.69	5.90

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	11	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.64	3.43	4.36	0.78	0.37
Delivery truck	1	1	23	180	0.21	0.68	2.7	8.38	0.89	0.402	1.30	5.18	16.06	1.71	0.77
Skid steer loader	2	4	38	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	5.38	24.43	57.82	9.60	4.89
Dump truck	2	1	11	275	0.21	0.68	2.7	8.38	0.89	0.402	1.90	7.56	23.47	2.49	1.13
Crane	1	8	11	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.39	8.68	56.58	9.31	2.80
										Subtotal	12.62	49.28	158.31	23.89	9.96
Small diesel engines	2	2	87	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	2.52	13.57	17.25	3.07	1.48

Parking Pavement 20,000 SF

Grading/Gravel

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	2	6	5	135	0.58	0.68	2.7	8.38	0.93	0.402	7.04	27.96	86.79	9.63	4.16
Skid steer loader	3	4	5	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Small generator	3	4	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
Dump truck (12 CY)	5	0.5	8	275	0.21	0.68	2.7	8.38	0.89	0.402	1.73	6.88	21.34	2.27	1.02
										Subtotal	10.27	42.00	122.52	14.32	6.41

	Small diesel engines	10	3	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.74	9.36	11.90	2.12	1.02

Paving

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Grader	1	6	2	150	0.59	0.68	2.7	8.38	0.93	0.402	1.59	6.32	19.62	2.18	0.94
Roller	2	6	2	30	0.59	1.8	5	6.9	1	0.8	1.69	4.68	6.46	0.94	0.75
Paver	1	8	2	107	0.59	0.68	2.7	8.38	0.93	0.402	1.51	6.01	18.66	2.07	0.90
Delivery truck	2	1	5	180	0.21	0.68	2.7	8.38	0.89	0.402	0.57	2.25	6.98	0.74	0.34
										Subtotal	5.36	19.27	51.73	5.93	2.92

Volume of hot mix asphalt 10000 ft^3
Average density of HMA 145 lb/ft^3
CARB EF for HMA 0.04 lb/ton
VOC emissions from HMA paving 29 lb

Pavement Marking 531 LF
' Solid Line= 215 ft/gal VOC content of paint = 1.3 lb/gal

VOC
lb
3

Airfield Pavements 375,000 SF
Grading/Gravel

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	10	299	0.58	0.68	2.7	8.38	0.93	0.402	41.60	165.17	512.62	56.89	24.59
Backhoe/loader	3	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	97.02	342.03	676.21	83.30	70.76
Grader	3	8	15	135	0.58	0.68	2.7	8.38	0.93	0.402	42.26	167.79	520.77	57.79	24.98
Small generator	3	8	90	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	15.62	84.21	107.09	19.04	9.16
Dump truck (12 CY)	32	1	90	275	0.21	0.68	2.7	8.38	0.89	0.402	249.34	990.02	3072.73	326.34	147.40
										Subtotal	445.84	1749.22	4889.43	543.37	276.90

Concrete apron construction

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	4	4	90	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	25.50	115.72	273.90	45.50	23.14
Concrete truck (9 CY)	24	1	64	250	0.21	0.68	2.7	8.38	0.89	0.402	120.89	480.01	1489.81	158.23	71.47
Dump truck (12 CY)	2	0.5	24	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Delivery truck	2	1	21	180	0.21	0.68	2.7	8.38	0.89	0.402	2.38	9.45	29.33	3.12	1.41
Backhoe/loader	2	8	90	98	0.21	0.99	3.49	6.9	0.85	0.722	64.68	228.02	450.81	55.53	47.17
										Subtotal	215.53	841.45	2269.46	265.09	144.42

Fuel Cell (1 Bay) 18,200 SF

Site prep (grading, compacting, drainage, etc.) 36,400 SF

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Dozer	2	8	2	299	0.58	0.68	2.7	8.38	0.93	0.402	8.32	33.03	102.52	11.38	4.92
Backhoe/loader	3	8	8	98	0.21	0.99	3.49	6.9	0.85	0.722	8.62	30.40	60.11	7.40	6.29
Grader	3	8	2	135	0.58	0.68	2.7	8.38	0.93	0.402	5.63	22.37	69.44	7.71	3.33
Small generator	3	8	8	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1.39	7.49	9.52	1.69	0.81
Dump truck (12 CY)	32	1	8	275	0.21	0.68	2.7	8.38	0.89	0.402	22.16	88.00	273.13	29.01	13.10
										Subtotal	46.13	181.30	514.72	57.19	28.46

Foundation (slab)

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	2	2	15	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	1.06	4.82	11.41	1.90	0.96
Concrete truck	5	1	6	250	0.21	0.68	2.7	8.38	0.89	0.402	2.36	9.38	29.10	3.09	1.40
Dump truck	9	1	4	275	0.21	0.68	2.7	8.38	0.89	0.402	3.12	12.38	38.41	4.08	1.84
Delivery truck	1	1	15	180	0.21	0.68	2.7	8.38	0.89	0.402	0.85	3.38	10.48	1.11	0.50
Backhoe/loader	1	8	3	98	0.21	0.99	3.49	6.9	0.85	0.722	1.08	3.80	7.51	0.93	0.79
Small generator	2	2	15	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.43	2.34	2.97	0.53	0.25
										Subtotal	8.90	36.09	99.88	11.63	5.75

Structure

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Small generator	2	4	12	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.69	3.74	4.76	0.85	0.41
Delivery truck	1	1	22	180	0.21	0.68	2.7	8.38	0.89	0.402	1.25	4.95	15.36	1.63	0.74
Skid steer loader	2	4	35	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	4.96	22.50	53.26	8.85	4.50
Dump truck	2	1	12	275	0.21	0.68	2.7	8.38	0.89	0.402	2.08	8.25	25.61	2.72	1.23
Crane	1	8	12	120	0.43	0.3384	0.8667	5.6523	0.93	0.2799	3.70	9.47	61.73	10.16	3.06
										Subtotal	12.67	48.91	160.72	24.20	9.93
Small diesel engines	2	2	105	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3.04	16.37	20.82	3.70	1.78

Hangar/Squad Ops/AMU 1,572 sf + depth contaminated soil 100 CY

Equipment	*Number*	*Hr/day*	*# days*	*Hp*	*LF*	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM g/hp-hr	VOC lb	CO lb	NOx lb	SO2 lb	PM lb
Skid steer loader	1	8	2	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	0.28	1.29	3.04	0.51	0.26
Dump truck	4	1	2	710	0.59	0.68	2.7	8.38	0.89	0.402	5.02	19.95	61.91	6.58	2.97
Backhoe/loader	1	5	2	98	0.21	0.99	3.49	6.9	0.85	0.722	0.45	1.58	3.13	0.39	0.33
Excavator	1	4	1	513	0.59	0.68	2.7	8.38	0.93	0.402	1.81	7.21	22.37	2.48	1.07
Dozer	1	4	1	620	0.59	0.68	2.7	8.38	0.93	0.402	2.19	8.71	27.03	3.00	1.30
Small generator	2	8	5	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0.58	3.12	3.97	0.71	0.34
										Subtotal	10.34	41.85	121.45	13.65	6.26

Fugitive Dust Emissions:

PM_{10} tons/acre/mo	acres	days of disturbance	PM_{10} Total Tons	$PM_{2.5}/PM_{10}$ Ratio	$PM_{2.5}$ Total Tons
0.42	5.7	321	25.5	0.1	3

POV Emissions from Construction Workers

Assume 6 miles per day per vehicle (one vehicle per worker)

On-base POV emissions

# vehicles	# days	mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SOx lb/mi	PM lb/mi	VOC lb	CO lb	NOx lb	SOx lb	PM lb
250	250	6	0.001497	0.013925	0.001489	0	0.000080	561.38	5221.88	558.38	3.375	29.87
							Subtotal	561	5,222	558	3	30

Construction emissions in 2011 (t/yr):

VOC	CO	NOx	SO2	PM_{10}	$PM_{2.5}$
0.98	5.14	7.30	0.81	25.89	2.97

Personnel Commuters

Operational Emissions - Transportation

Commuting Personnel from Surrounding Communities

Total Commuters 464 BRAC

509 Post BRAC

POV Emissions from Comuting Working Military and Civilians

Assume 20 miles per day per vehicle (one vehicle per worker)

BRAC

Commuting POV emissions

			VOC	CO	NOx	SOx	PM	VOC	CO	NOx	SOx	PM	BRAC Commuter TOTAL				
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb	VOC Tons	CO Tons	NOx Tons	SOx Tons	PM Tons
464	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	3473.04	32306.00	3454.48	20.88	184.81	1.74	16.15	1.73	0.01	0.09

POST BRAC

Commuting POV emissions

			VOC	CO	NOx	SOx	PM	VOC	CO	NOx	SOx	PM	Post-BRAC Commuter TOTAL				
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb	VOC Tons	CO Tons	NOx Tons	SOx Tons	PM Tons
45	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	336.83	3133.13	335.03	2.025	17.92	0.17	1.57	0.17	0.00	0.01

CUMULATIVE TOTAL (BRAC plus Post BRAC)

Commuting POV emissions

			VOC	CO	NOx	SOx	PM	VOC	CO	NOx	SOx	PM	Commuter TOTAL				
# vehicles	# days	mi/day	lb/mi	lb/mi	lb/mi	lb/mi	lb/mi	lb	lb	lb	lb	lb	VOC Tons	CO Tons	NOx Tons	SOx Tons	PM Tons
509	250	20	0.001497	0.013925	0.001489	0.000009	0.000080	3809.87	35439.13	3789.51	22.905	202.74	1.90	17.72	1.89	0.01	0.10

B AIRSPACE MANAGEMENT AND AIR SAFETY

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B.1 AIRSPACE MANAGEMENT

B.1.1 Edwards AFB, Restricted Area R-2515, and the R-2508 Complex

Since the year 2000 the level of flight activity at AFFTC and Edwards AFB has remained fairly constant. Typically, when a flight test program is completed a new flight test program begins. The number of personnel, vehicles, aircraft, and basic infrastructure needed to support these flight activities is proportionate to the number of sorties flown. The number of sorties associated with operations at Edwards AFB (including NASA-related flights) from 2000 through 2004 have been approximately 10,500 per year (AFFTC 2005) Table B.1-1.

Table B.1-1

Sortie Summary by Aircraft and Year at AFFTC

	Year				
Aircraft Type	**2000**	**2001**	**2002**	**2003**	**2004**
B-1	110	118	135	81	74
B-2	15	44	9	47	36
B-52	47	69	61	70	66
BE-20	0	3	53	28	5
BE-200	50	66	75	49	44
Boeing 737/747/757	14	12	14	46	13
C-5	0	0	3	34	67
C-12	451	483	494	600	602
C-130	106	163	92	84	145
C/KC-135	674	653	784	837	709
C-17	194	139	223	194	221
CH-46	275	266	326	346	76
CH-53	133	227	319	220	62
DC-8	12	19	44	34	16
ER-2	74	95	78	34	19
F-117	391	312	337	274	342
F-15	1,088	920	843	820	596
F-16	3,128	2,706	2,782	3,035	2,978
F-18	624	479	463	349	271
F-22	154	337	565	909	1,021
HH-60G	0	16	80	111	140
KC-10	24	55	65	67	180
T/AT-38	2,773	2,315	1,926	1,894	1,545
X-45/X-47	0	0	7	10	27
Other	915	910	672	522	474
Totals	11,252	10,407	10,450	10,695	9,729

Source: AFFTC 2005

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B.2 AIRSPACE MANAGEMENT

B.2.1 OVERVIEW

Airspace is defined as the space that lies above a nation and comes under its jurisdiction. Although it is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. Under Public Law (P.L.) 85-725, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of the nation's airspace and has therefore established certain criteria and limits for its use. In order to accomplish its task, the FAA utilizes the National Airspace System (NAS).

Part of the NAS includes Special Use Airspace (SUA). SUA consists of airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both (FAA 2000). Except for controlled firing areas, SUA areas are depicted on aeronautical charts. Generally SUA consist of the following:

- Prohibited Areas— There are no prohibited areas within the region of interest for the alternatives.

- Restricted Areas—These are areas that denote the existence of unusual, often invisible hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. An aircraft may not enter a restricted area unless permission has been obtained from the controlling agency. Restricted areas are depicted on aeronautical charts and are published in the *Federal Register*.

- Warning Areas—There are no warning areas within the region of interest for the alternatives.

- Military Operation Areas (MOAs)—These are areas that consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from instrument flight rules (IFR) traffic. There is no restriction against a pilot operating in visual flight rules (VFR) in these areas; however, a pilot should be alert since training activities may include acrobatic and abrupt maneuvers. MOAs are depicted on aeronautical charts.

- Alert Areas—There are no alert areas within the region of interest for the alternatives.

- Controlled Firing Areas (CFAs)—There are no CFAs within the region of interest for the alternatives.

Detailed information on the restricted areas R-2515 and R-2508 SUA are available in the *R-2508 Users Guide*, which can be found at http://r2508.edwards.af.mil/. Armed munitions integration testing will be entirely within SUA restricted areas R-2515 within the R-2508 Complex.

The R-2508 Complex Control Board reported that between 1990 and 2002 approximately 558,300 aircraft flight operations (sorties) (not including helicopter flights) occurred in the R-2508 Complex. From 1990 to 2002 the R-2508 averaged over 42,900 flight operations per year and from 1997 to 2002 averaged over 35,000 flight operations per year. From 1990 to 2002 approximately 233,100 flight operations occurred in restricted area R-2515; averaging approximately 17,900 flight operations per year from 1990 to 2002 and 13,800 flight operations from 1997 to 2002 (AFFTC 2005). In 2005 there were approximately 8,950 aircraft sorties at Edwards AFB (Hagenauer 2006). A listing of annual aircraft sorties by SUA in the R-2508 Complex is shown in Appendix B.1.

B.2.2 ALTERNATIVES A, B, AND C (FLIGHT OPERATIONS IN THE R-2508 COMPLEX, RESTRICTED AREA R-2515, AND EDWARDS AFB)

B.2.2.1 R-2508 Complex

Table B.2-1 gives the name/number, effective altitude, time of use, and controlling agency for the SUA that are included in the R-2508 Complex. Hand-Launched UAVs, M-UAVs, JT-UAVs, and UAV-Es like the Global Hawk, Predator, X-43, X-47A, and Raven currently operate or have been operated in the R-2508, restricted area R-2515, and the airspace above Edwards AFB. There are over 20,000 square miles of airspace in the R-2508 Complex that have been designated as restricted for use by the DoD, National Aeronautics and Space Administration (NASA), and other government agencies. This airspace is over an area 140 miles north to south (Bishop to Edwards AFB) and 110 miles east to west (Nevada state line to Bakersfield). This airspace is scheduled, monitored, regulated, and controlled to provide safe aircraft test areas. Aircraft operational characteristics and altitudes are regulated in this airspace to minimize ground-based conflicts. The R-2508 Complex encompasses large portions of Inyo, Kern, San Bernardino, and Tulare counties in east-central California. It also includes a portion of Fresno and Los Angeles counties in California and extends into Nevada's Esmeralda County (NASA 1997a).

Table B.2-1

Special Use Airspace of the R-2508 Complex

Number/Name	Effective Altitude (feet)	Time of Use (PST)	Controlling Agency
R-2508 Complex			
R-2502E	Unlimited	Continuous	Hi-Desert TRACON
R-2502N	Unlimited	Continuous	Hi-Desert TRACON
R-2505	Unlimited	Continuous	Hi-Desert TRACON
R-2506	6,000 MSL	0600–1800 M– F[1]	Hi-Desert TRACON
R-2508	FL 200 to Unlimited	Continuous	Hi-Desert TRACON
R-2515	Unlimited	Continuous	Hi-Desert TRACON
R-2524	Unlimited	Continuous	Hi-Desert TRACON
Bakersfield MOA	2,000 AGL–FL 180	0600–1800 M– F[1]	ZLA CNTR
Barstow MOA	200 AGL–FL 180	0600–1800 M– F[1]	Hi-Desert TRACON
Bishop MOA	200 AGL–FL 180	0600–1800 M– F[1]	ZLA CNTR
Buckhorn MOA	200 AGL[2]	0600–1800 M– F[1]	Hi-Desert TRACON
Isabella MOA	200 AGL[2,3]	0600–1800 M– F[1]	Hi-Desert TRACON
Owens MOA	200 AGL–FL 180[3]	0600–1800 M– F[1]	Hi-Desert TRACON
Panamint MOA	200 AGL–FL 180	0600–1800 M– F[1]	Hi-Desert TRACON
Porterville MOA	2,000 AGL–FL 180	0600–1800 M– F[1]	Hi-Desert TRACON
Saline MOA	200 AGL–FL 180	0600–1800 M– F[1]	Hi-Desert TRACON
Shoshone North MOA	200 AGL–FL 180	0600–1800 M– F[1]	ZLA CNTR
Shoshone South MOA	FL 180–FL 600	0600–1800 M– F[1]	ZLA CNTR

Notes: 1-Other times by NOTAM.
2- Up to but not including FL 180.
3- Excluding 3,000 feet AGL and below over Domeland Wilderness Area.
AGL- above ground level
FL- flight level (FL 180 = approximately 18,000 feet above mean sea level)
MOA- Military Operation Area
NOTAM- Notice to Airmen
R- restricted
TRACON- Terminal Radar Control

Source: Federal Aviation Administration (FAA) 2005.

B.2.2.2 Low-Level Test and Training Routes

The R-2508 Complex has unique characteristics that allow the Air Force, Navy, Marine Corps, Army, NASA, and other federal and commercial testing entities to conduct safe, large-scale testing activities for aircraft, spacecraft, and advanced weapon systems. Restricted airspace is established by the FAA to contain or segregate activities that would be hazardous to non-participating aircraft. Military Operating

Areas (MOAs) are defined airspace areas established by FAA to separate/segregate certain military aviation activities from Instrument Flight Rules (IFR) traffic and to identify where these activities are conducted for Visual Flight Rules (VFR) traffic. Within this SUA are Military Training Routes (MTRs) (IFR and VFR), Colored Routes, and Terrain Following Routes (TFRs).

Within the R-2508 Complex there are seven IFR and VFR low-altitude training routes and one slow-speed, low-altitude training route (SR-390). All routes within the ROI that transit the boundaries of the R-2508 Complex are governed by the flight restrictions and requirements to "see and avoid" other aircraft when operating under VFR flight rules. All routes are designated as MARSA operations, which are established by coordinated scheduling. Hours of operation are normally daylight hours. Other hours are by NOTAM, except for Instrument Routes 211 and 212 and VRs 1206, 1206, 1214, 1215, 1217, and 1293, which have continuous hours of operation (National Geospatial-Intelligence Agency 2004).

The eight Colored Routes provide flight corridors for low-level flight tests and training. These Colored Routes are not published on standard aeronautical charts because they are within the SUA of the R-2508 Complex and/or adjacent MOAs. The isolation of the Colored Routes from most civilian air-traffic provides a reduced potential for mid-air collisions with VFR civilian traffic.

The seven TFRs are considered "unpublished" because they are not depicted on standard aeronautical charts used by most pilots and are all located within the R-2515 restricted area and/or the Isabella MOA.

A detailed description of the low-level test and training routes can be found in the *Environmental Assessment for Low-Level Flight Testing, Evaluation, and Training* (Air Force Flight Test Center 2005).

UAV flights for Alternatives A, B, and C would only operate on portions of the routes that lie within their respective ROI.

B.2.2.3 En Route Victor Airways and Jet Routes

There are no en route victor low-altitude (up to but not including 18,000 feet above MSL) airways that transect the airspace within the R-2508 Complex (Figure B.2-2 and B.2-4). The J110 jet route transects the northern one-third of the R-2508 Complex; however this jet route is normally unavailable during daylight hours Monday through Friday.

B.2.2.4 Airports

There are several public-use civilian airports within the R-2508 Complex ROI. These include Borax, Boron, California City Municipal, Death Valley, Goldstone/GTS Private, Independence, Inyokern, Kern

Valley, Lone Pine, Mojave, Mountain Valley, Rosamond Skypark, Shoshone, Stove Pipe Wells, Tehachapi Municipal, and Trona (AFFTC 1997). Edwards AFB runways (including lakebed runways) and Naval Air Weapons Station (NAWS) China Lake/Armitage Field are the only military airfields (National Aeronautical Charting Office [NACO] 2004a) located in the R-2508 Complex (Figure B.2-5).

B.2.2.5 Air Traffic Control

The R-2508 Complex lies exclusively within the Los Angeles ARTCC's boundaries (NACO 2004a). The controlling agency for the SUA within R-2508 Complex is Hi-Desert TRACON. During the published hours of use (identified in Table 3-6), the using agency is responsible for controlling all military activity within the SUA and ensuring that its perimeters are not violated. When the airspace is scheduled to be inactive, the using agency releases it back to the controlling agency (Hi-Desert TRACON), and in effect, the airspace is no longer restricted. If no activity is scheduled during some of the published hours of use, the using agency releases the airspace to the controlling agency for non-military operations for that period of inactivity (Illman 1993).

B.2.2.6 Supersonic Corridors

Currently there are three supersonic corridors within the R-2508 Complex that cross or are contained within restricted area R-2515; the Alpha/PIRA Supersonic Corridor, the Black Mountain Supersonic Corridor, and the High Altitude Supersonic Corridor. The minimum altitude for flight operations in the Alpha Corridor/PIRA supersonic area and Black Mountain supersonic corridor is 500 feet AGL. The Alpha Corridor/PIRA supersonic area is 20 NM long and 4 NM wide; the Black Mountain Supersonic Corridor ranges from 38 to 48 NM long and 8 miles wide except for a semicircular area for maneuvers that extends the width to 12 NM. Currently the minimum altitude for aircraft to use the High Altitude Supersonic Corridor is from 30,000 feet above MSL to unlimited altitude. The High Altitude Supersonic Corridor is 224 NM long and 15 NM wide. From 1980 to 1999 there were approximately 607 supersonic flights annually that operated in the supersonic corridors and work areas at Edwards AFB and the R-2508 Complex (AFFTC 2001). Figure B.2-1 shows the supersonic corridors in the R-2508 Complex.

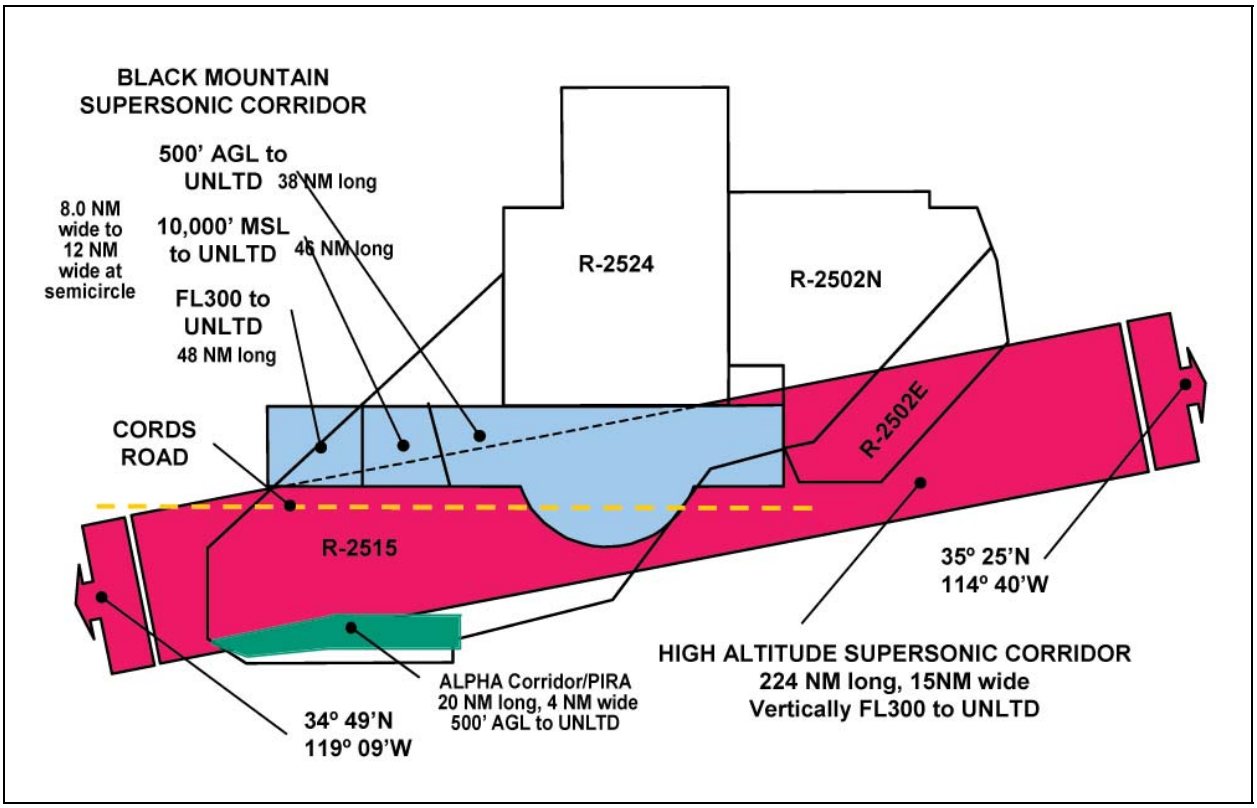


Figure B.2-1

Supersonic Corridors in the R-2508 Complex

B.2.2.3 Restricted Area R-2515 and Edwards AFB

Table B.2-2 gives the name/number, effective altitude, time of use, and the controlling agency for the special use airspace within restricted area R-2515 and the surrounding area.

Table B.2-2

Special Use Airspace In and Surrounding R-2515 and Edwards AFB

Number/Name	Effective Altitude (feet)	Time of Use	Controlling Agency
R-2508 COMPLEX			
R-2508	FL 200 to Unlimited	Continuous	HI-DESERT TRACON
R-2515	Unlimited	Continuous	HI-DESERT TRACON
Buckhorn MOA	200 AGL[(b)]	0600–2200[(a)] M–F	HI-DESERT TRACON
Isabella MOA	200 AGL[(b,c)]	0600–2200[(a)] M–F	HI-DESERT TRACON
Panamint MOA	200 AGL[(b)]	0600–2200[(a)] M–F	HI-DESERT TRACON

Notes: a-Other times by NOTAM.

b- Up to but not including FL 180.

c- Excluding 3,000 feet AGL and below over Domeland Wilderness Area.
AGL- above ground level
FL- flight level (FL 180 = approximately 18,000 feet above mean sea level)
MOA- Military Operation Area
NOTAM- Notice to Airmen
R- restricted
TRACON- Terminal Radar Control

Source: National Aeronautical Charting Office 2004a, b, and c.

There are 1,575 square miles of airspace that have been designated as restricted for use by DoD, National Aeronautics and Space Administration (NASA), and other government agencies. This airspace is over a remote area 40 to 60 miles north of Los Angeles, California. Known by its FAA designation as the R-2515, this airspace is scheduled, monitored, regulated, and controlled to provide safe aircraft test areas. Aircraft operation characteristics and altitudes are regulated in this airspace to minimize ground-based conflicts, which are primarily due to noise. The R-2515 complex encompasses portions of Kern, San Bernardino, and Los Angeles counties in east central California (NASA 1999).

Special use airspace within Alternatives A and B includes the restricted area R-2515 over Edwards AFB. The Buckhorn, Panamint, and Isabella MOAs surround the R-2515 restricted area. There are no warning, prohibited, or alert special use airspace areas within Alternatives A, B, and C (National Geospatial-Intelligence Agency 2004).

Military Training Routes

Alternatives A, B, and C contain one IR (IR-236), one Visual Route (VR) low-altitude military training route (VR-1293), and one slow-speed, low-altitude training route (SR-390) (Figure B.2-3). All routes within the ROI that transit the boundaries of the R-2515 are governed by the flight restrictions and requirements to "see and avoid" other aircraft when operating under VFR. All routes are designated as "military assumes responsibility for separation of aircraft" (MARSA) operations, which are established by coordinated scheduling. Hours of operation are continuous except for IR-236, which operates daily from 0600 to 2200 hours local time (National Geospatial Intelligence Agency 2004).

En Route Victor Airways and Jet Routes

There are no en route victor low-altitude (up to but not including 18,000 feet above MSL) airways or high-altitude jet routes that transect the airspace within Alternatives A, B, or C (Figures B.2-2 and B.2-4).

Airports/Airstrips

There are several airports/airstrips within the ROI for Alternatives A, B, and C. These include Edwards AF Aux North Base, Borax Private, and Edwards AFB (Figures B.2-4 and B.2-5).

Air Traffic Control

Alternatives A, B, and C lie exclusively within the Los Angeles Air Route Traffic Control Center's (ARTCC's) boundaries (National Aeronautical Charting Office [NACO] 2004 a, b, and c). The controlling agency for the Restricted Areas and MOAs within the R-2515 is TRACON. During the published hours of use (identified in Table B.2-1), the using agency is responsible for controlling all military activity within the special use airspace and ensuring that its perimeters are not violated. When scheduled to be inactive the using agency releases the airspace back to the controlling agency (Los Angeles ARTCC), and in effect, the airspace is no longer restricted. If no activity is scheduled during some of the published hours of use, the using agency releases the airspace to the controlling agency for non-military operations for that period of inactivity (Illman 1993).

LEGEND

0 10 20 30

SCALE IN NAUTICAL MILES

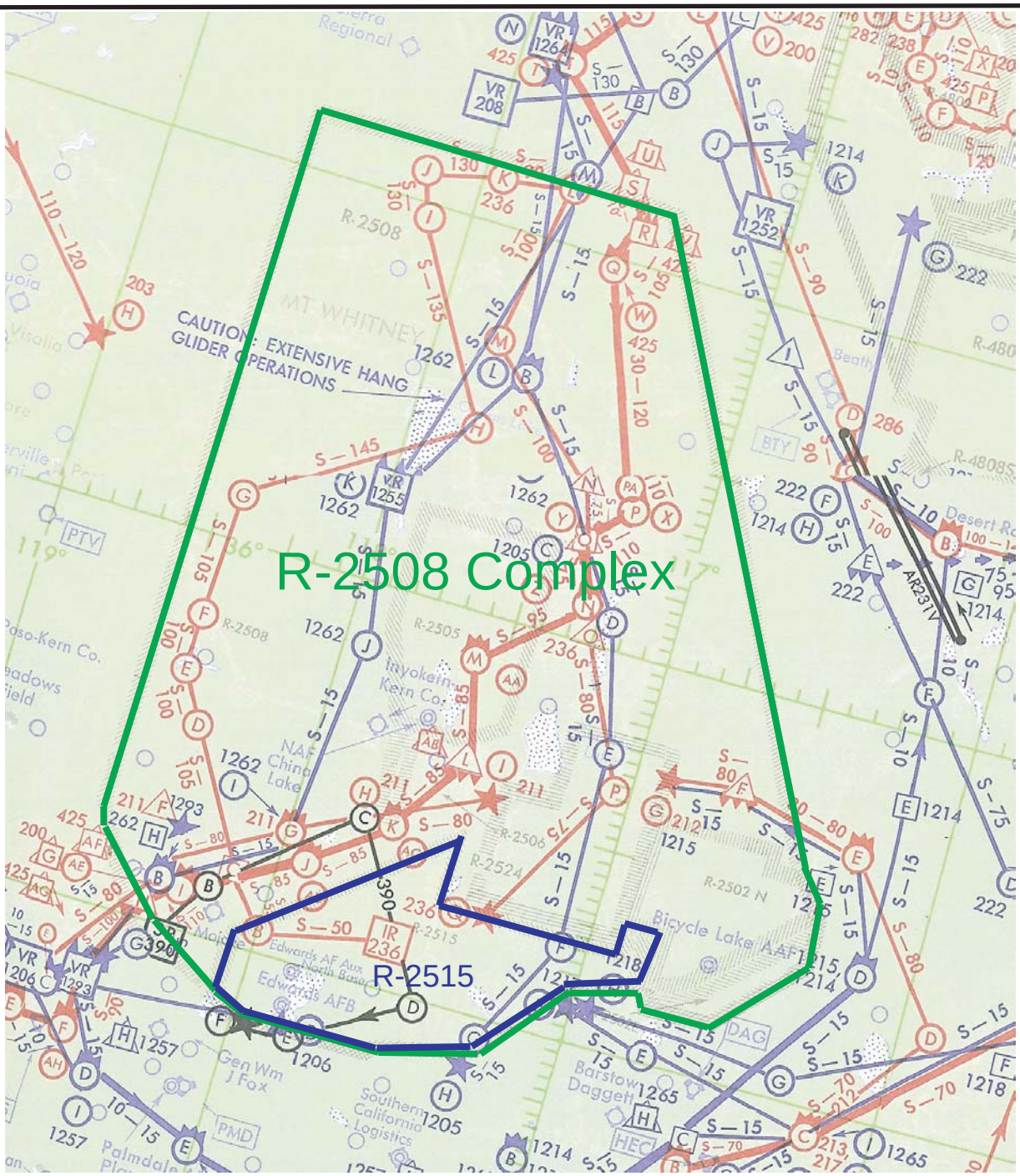
Note: Airports shown have a minimum of 5,000 feet of hard surface runway. Airports and airfields in blue and green have published approaches.

- J5 — Jet Routes
- Special Use Airspace and Warning Areas
- Civilian Airport (Blue, Green, Brown)
- Military Airfields (Blue, Green)

Environmental Assessment for the Routine and Recurring Unmanned Aerial Vehicle Flight Operations at Edwards AFB

SPECIAL USE AIRSPACE, JET ROUTES, AND AIRPORTS UNDER ALTERNATIVES A, B, and C

DATE	FILE NO.	FIGURE NO.
6/12/06	Q267-05/fig/b.2-2.pdf	B.2-2



LEGEND

Special Use Airspace in the R-2508 Complex

- R-2515
- R-2508 Complex

- Civilian Airport
- Military Airfields
- Instrument Route (IR) Military Training Route
- Visual Route (VR) Military Training Route
- Slow Route (SR) Military Training Route

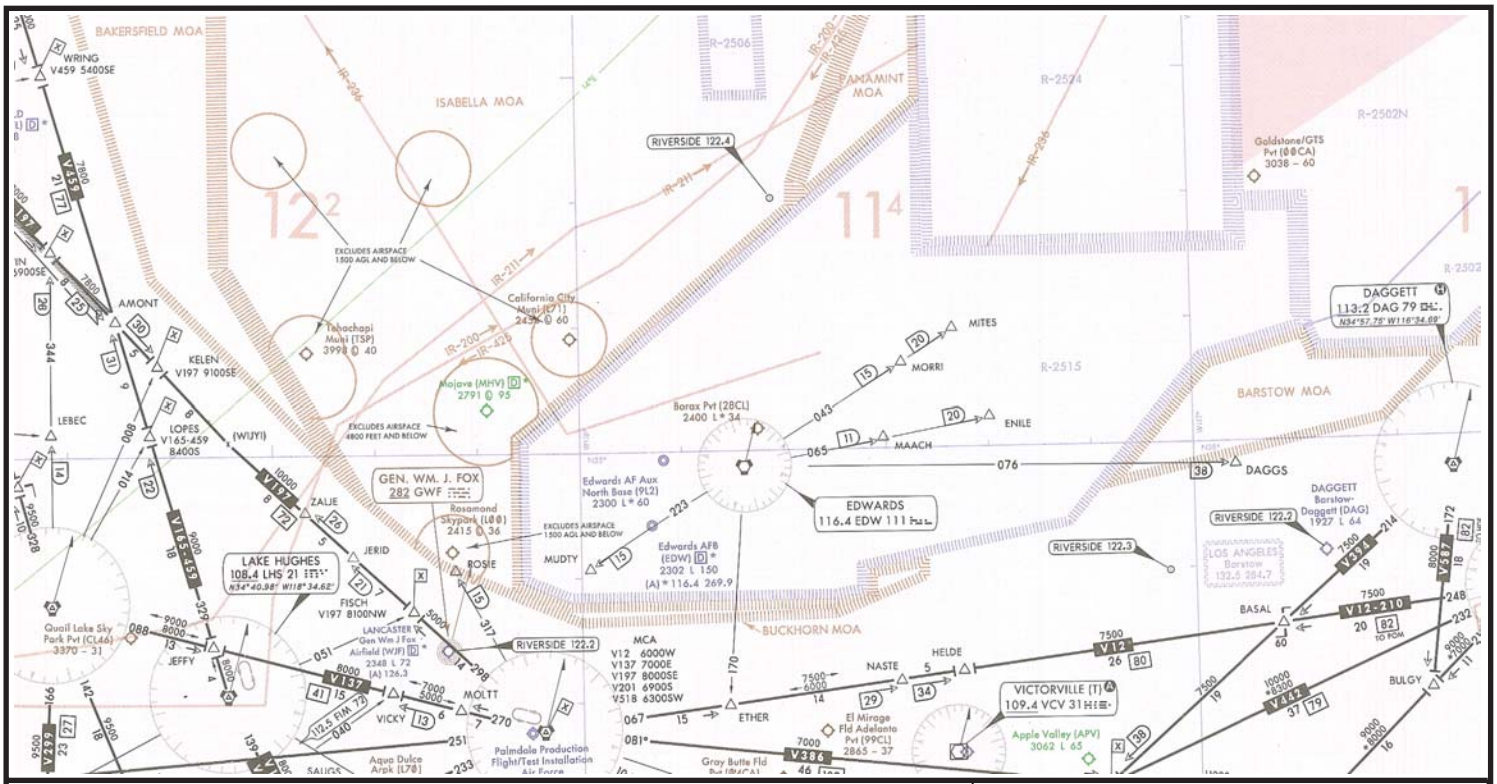
0 15 30

SCALE IN NAUTICAL MILES

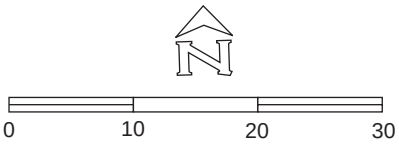
EA for the Routine and Recurring Unmanned Aerial Vehicle Flight Operations at Edwards Air Force Base, California

SPECIAL USE AIRSPACE, MILITARY TRAINING ROUTES, AND AIRPORTS

TASK NO.	DATE	FILE NO.	FIGURE NO.
Q267-05	6/12/06	Q267-05/fig/b.2-3	B.2-3



LEGEND



SCALE IN NAUTICAL MILES

V32 — Victor Routes

Special Use Air Space and Warning Areas

Civilian Airport

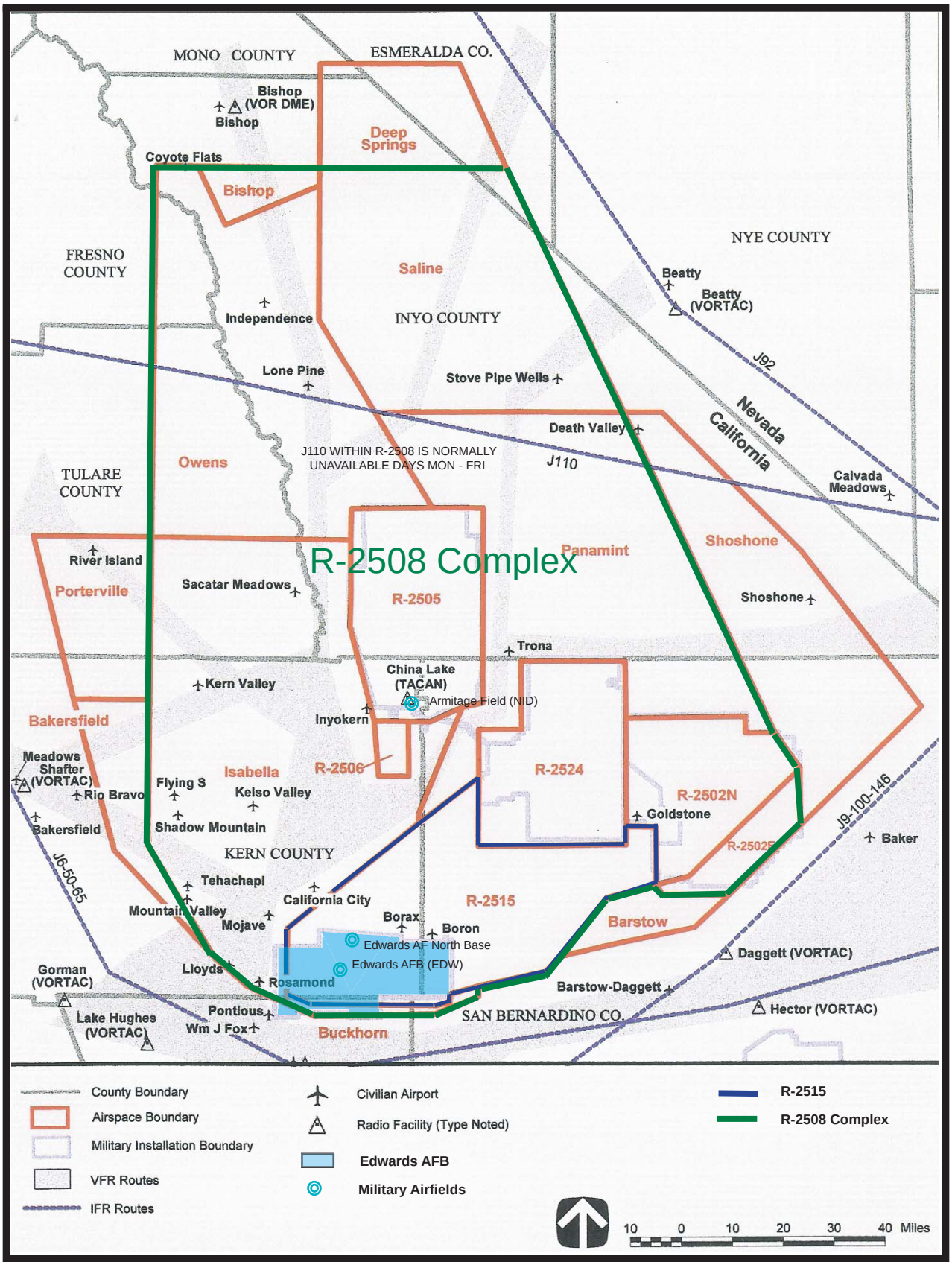
Military Airfields

Military Operating Areas

Environmental Assessment for the Routine and Recurring UAV Flight Operations at Edwards AFB

SPECIAL USE AIRSPACE, VICTOR ENROUTE AIRWAYS, AND AIRPORTS UNDER ALTERNATIVES A, B, and C

DATE	FILE NO.	FIGURE NO.
6/12/06	Q267-05/fig/b.2-4.pdf	B.2-4



Airports and Airstrips in the R-2508 Complex	Q267-05	B.2-5	6/12/06

TABLE 31

TOTAL COMBINED AIRCRAFT OPERATIONS AT AIRPORTS

WITH FAA AND CONTRACT TRAFFIC CONTROL SERVICE

(In Thousands)

FISCAL YEAR	AIR CARRIER	AIR TAXI/ COMMUTER	GENERAL AVIATION			MILITARY			TOTAL	NUMBER OF TOWERS	
			ITINERANT	LOCAL	TOTAL	ITINERANT	LOCAL	TOTAL		FAA	CONTRACT
Historical*											
2000	15,158.7	10,760.6	22,844.1	17,034.4	39,878.5	1,422.0	1,448.2	2,870.2	68,668.0	288	165
2001	14,762.8	10,882.1	21,433.3	16,193.7	37,627.0	1,493.0	1,437.6	2,930.6	66,202.5	288	192
2002	13,209.7	11,029.4	21,450.5	16,172.8	37,623.2	1,552.5	1,511.0	3,063.5	64,925.9	266	206
2003	12,823.9	11,426.0	20,231.3	15,292.1	35,523.5	1,528.7	1,480.5	3,009.2	62,782.5	266	217
2004	12,934.0	12,243.9	20,007.2	14,960.4	34,967.6	1,498.8	1,480.5	2,979.3	63,124.8	266	228
2005E	13,531.4	12,571.9	19,284.1	14,817.8	34,101.9	1,405.5	1,448.0	2,853.5	63,058.7	266	234
Forecast											
2006	13,396.1	12,454.2	19,064.2	15,010.0	34,074.2	1,414.0	1,449.1	2,863.1	62,787.6	266	241
2007	13,797.2	12,794.2	19,520.5	15,492.0	35,012.5	1,431.1	1,451.3	2,882.3	64,486.3	266	241
2008	14,146.8	13,114.1	19,866.6	15,647.0	35,513.6	1,431.1	1,451.3	2,882.3	65,656.7	266	241
2009	14,515.5	13,455.0	20,345.4	15,866.0	36,211.5	1,431.1	1,451.3	2,882.3	67,064.3	266	241
2010	14,882.4	13,804.9	20,874.8	16,119.9	36,994.7	1,431.1	1,451.3	2,882.3	68,564.3	266	241
2011	15,264.1	14,177.6	21,427.1	16,393.9	37,821.1	1,431.1	1,451.3	2,882.3	70,145.1	266	241
2012	15,668.8	14,560.4	21,971.3	16,705.4	38,676.7	1,431.1	1,451.3	2,882.3	71,788.2	266	241
2013	16,086.3	14,953.5	22,474.9	17,039.5	39,514.4	1,431.1	1,451.3	2,882.3	73,436.6	266	241
2014	16,531.3	15,372.2	22,960.3	17,380.3	40,340.6	1,431.1	1,451.3	2,882.3	75,126.4	266	241
2015	16,993.2	15,802.6	23,422.4	17,727.9	41,150.3	1,431.1	1,451.3	2,882.3	76,828.4	266	241
2016	17,482.6	16,245.1	23,863.2	18,082.5	41,945.7	1,431.1	1,451.3	2,882.3	78,555.7	266	241
2017	18,003.0	16,683.7	24,295.8	18,444.1	42,739.9	1,431.1	1,451.3	2,882.3	80,309.0	266	241
Avg Annual Growth 2005-2017	2.4%	2.4%	1.9%	1.8%	1.9%	0.2%	0.0%	0.1%	2.0%		

* Source: FAA Air Traffic Activity.

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Chapter

2

2.0 General Operating Procedures for R-2508 Complex

This chapter discusses general operating procedures relating to all work areas, including:

2.1 General Complex Information

2.2 The Scheduling Process

2.3 Complex Scheduling Agencies

2.4 Special Activities

2.5 Scheduling Special Operations

2.6 Scheduling Large-Scale Exercises

2.7 Operating Remotely Operated Aircraft (ROA)

2.8 Flight Planning Requirements

2.1 General Complex Information

The Joint Policy and Planning Board (JPPB) is chartered by DoD to act as the overarching and policy body for the R-2508 Complex. All JPPB sponsored units operating within the R-2508 complex **shall receive an annual face-to-face R-2508 Complex briefing** on Complex Operations and Procedures from the R-2508 Central Coordinating Facility (CCF) or their sponsoring JPPB Commander (e.g. Navy/Marine Corps units are sponsored by the Commander, NAWCWD). The R-2508 brief will address scheduling procedures; safety concerns, and overflight sensitivities. Annual briefings are normally conducted in January and February each year. Additionally, CCF provides airspace briefings for special/large scale operations on an as needed basis.

****Commanders of units flying in the R-2508 Complex are responsible for ensuring their aircrews are briefed annually on R-2508 Complex procedures****

- Users include participating aircraft transiting the airspace to installations located within the R-2508 Complex.
- Civilian aircrews operating under an R-2508 Complex Letter of Agreement (LOA) are required to comply with the briefing requirements and operating procedures defined herein, except as modified by the terms of the LOA.
- Any JPPB sponsored unit that hosts a transient unit will be responsible for that transient unit's compliance with R-2508 Complex operations and Procedures.
- Only JPPB sponsored activities that have received the annual R-2508 Complex brief will be allowed to schedule missions in the complex

The R-2508 Complex is comprised of Military Operations Areas (**MOA**s) and Air Traffic Control Assigned Airspace (**ATCAA**s).

MOAs: The four main MOA work areas—Isabella, Owens, Saline, and Panamint—have a minimum altitude boundary of 200 feet AGL (see Figure 2-1).

- MOAs **DO NOT** include airspace below 1,500 feet AGL within 3 miles of any charted airport, except for Mojave Airport's Class D airspace (4,800 feet MSL within a 5 NM radius, excluding the airspace east and parallel to a line ½ mile west of R-2515).
- **Portions of these major work areas are located over Sequoia/Kings Canyon National Parks, John Muir and Domeland Wilderness Areas, and Death Valley National Park, (see Figures 7-4 & 7-5) where the lower limit of the MOA is 3,000 feet AGL.**

NOTE: Exclusion of MOA airspace about the Death Valley National Park and Domeland Wilderness Area applies to the 1977 contours of the former National Monument and Wilderness Area. This difference in affected airspace may not be accurately reflected in Sectional Charts. Refer to Figures 7-4 & 7-5 in Section 7.0 and contact CCF for more information.

CAUTION! The Owens MOA does not include the airspace that is designated as Bishop MOA (Figures 2-1 and 2-2). Aircrews must be aware of this boundary difference to prevent spillouts into Oakland Air Route Traffic Control Center (ARTCC) airspace.

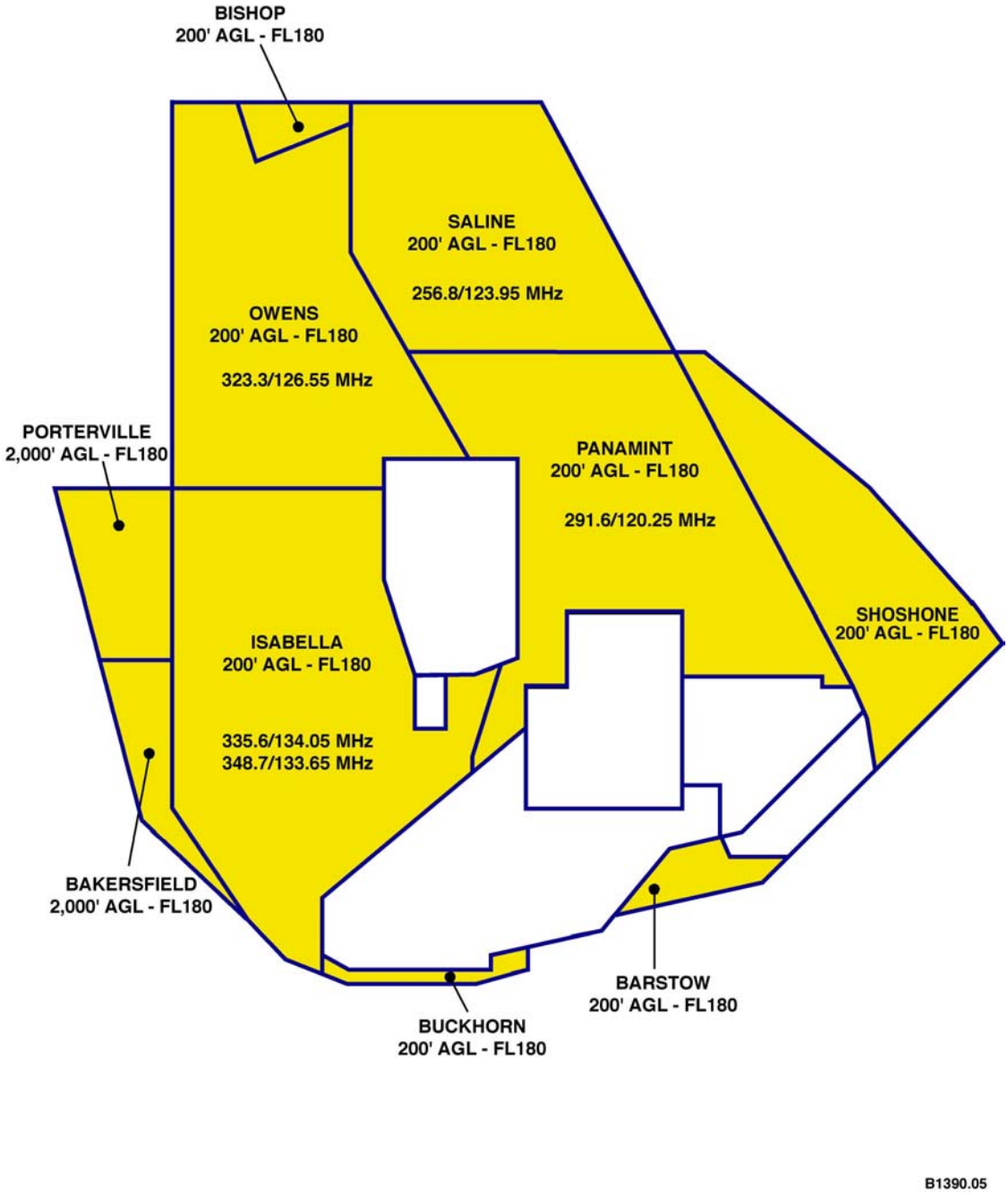

Figure 2-1. *Military Operations Areas (**MOAs**).*

ATCAAs: The ATCAAs (Figure 2-2) are used to fill the airspace gap between the top of the MOAs (FL180) and the base of R-2508 (FL200). When R-2508 is not activated, the ATCAAs may extend upward to FL600. ATCAAs are also located above the peripheral MOAs, outside the lateral boundaries of R-2508, to provide additional work areas up to FL600 for segregation of military operations from IFR traffic.

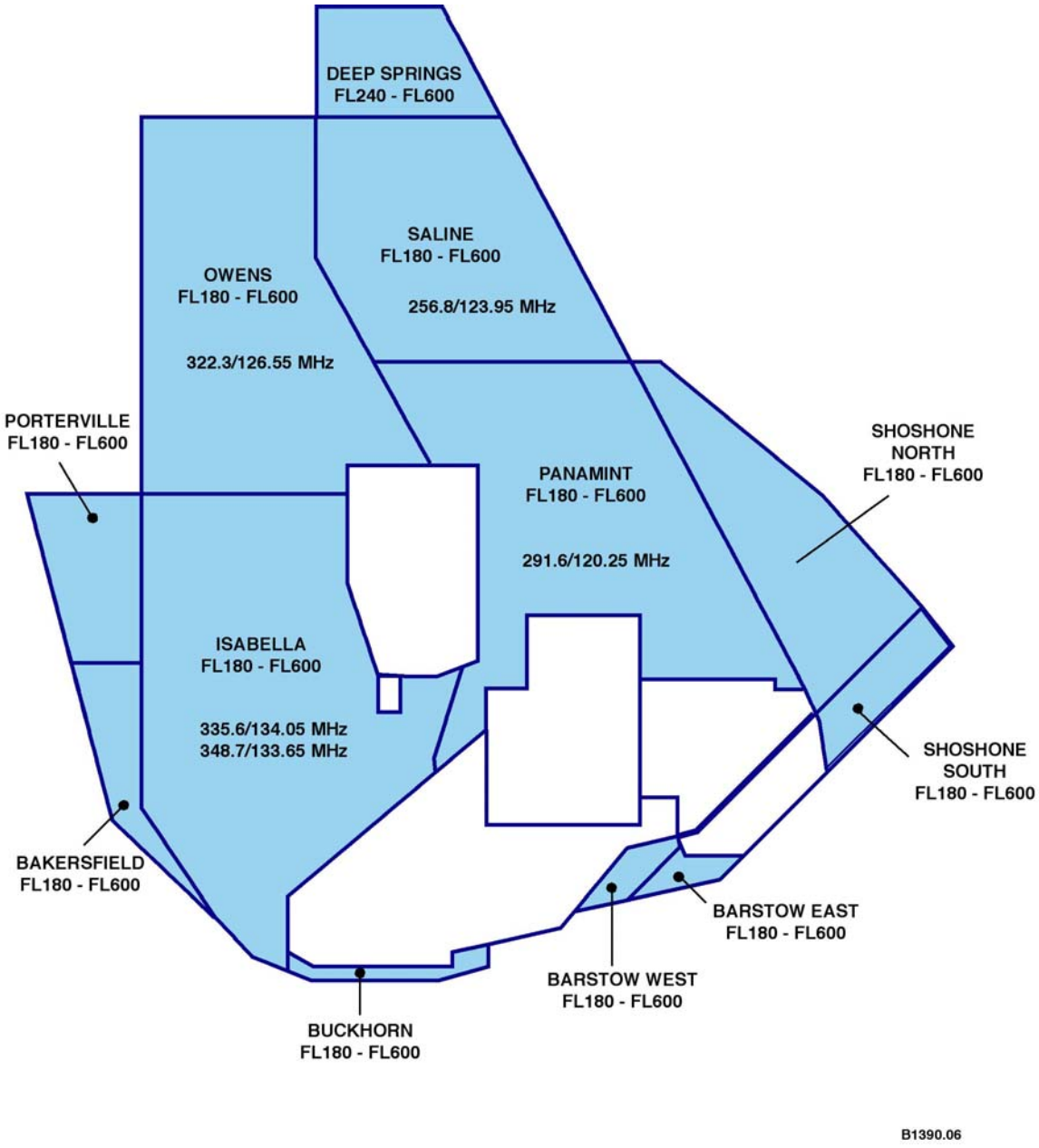

Figure 2-2. *Air Traffic Control Assigned Airspace (**ATCAAs**).*

2.2 The Scheduling Process

R-2508 Complex scheduling requirements apply to all Complex flight activities, including special operations and large-scale exercises.

CCF is the designated airspace management and scheduling authority for the R-2508 Restricted Area, Military Operations Areas (MOAs), and Air Traffic Control Assigned Airspace (ATCAAs). CCF coordinates mission requirements of all R-2508 Complex users to ensure optimum airspace utilization and safety.

NOTE*: Military units requiring use of R-2508 Complex airspace must comply with scheduling requirements established in OPNAVINST 3710.7, AFI 13-201, U.S. Army AR 95-50, FLIP, and this Handbook.*

2.2.1 Airspace Scheduling

Airspace is either activated for military use or released for joint use.

When R-2508 Complex airspace is activated for military use, it is reserved as **scheduled**. When Complex airspace is not scheduled, it is released to the Federal Aviation Administration (FAA) for **Joint-Use**.

When scheduling airspace:

- **Request only those areas and altitudes necessary for mission completion.** Additional areas and altitudes may be requested in flight, if required, contingent upon the status of the airspace (activated for military use or released for joint use).
- **CCF must have 2 hours notice to reactivate MOA/ATCAA airspace.** JOSHUA (FAA) will NOT issue a work area clearance when airspace is released for joint use.
- **Schedule any weekend and holiday operations through CCF during normal CCF operating hours, M-F 0600-1800 Local** (excluding Federal holidays) **at 661-277-2508 DSN 527-2508.**
- **Outside normal working hours, changes to *previously scheduled* events shall be coordinated with the CCF duty airspace manager at: 1-866-805-2851.**
- **Changes in Area that require activation of additional airspace must be made at least 2 hours in advance to activate the airspace.**

NOTE: TRACON is NOT authorized to schedule or activate any unscheduled R-2508 Complex airspace.

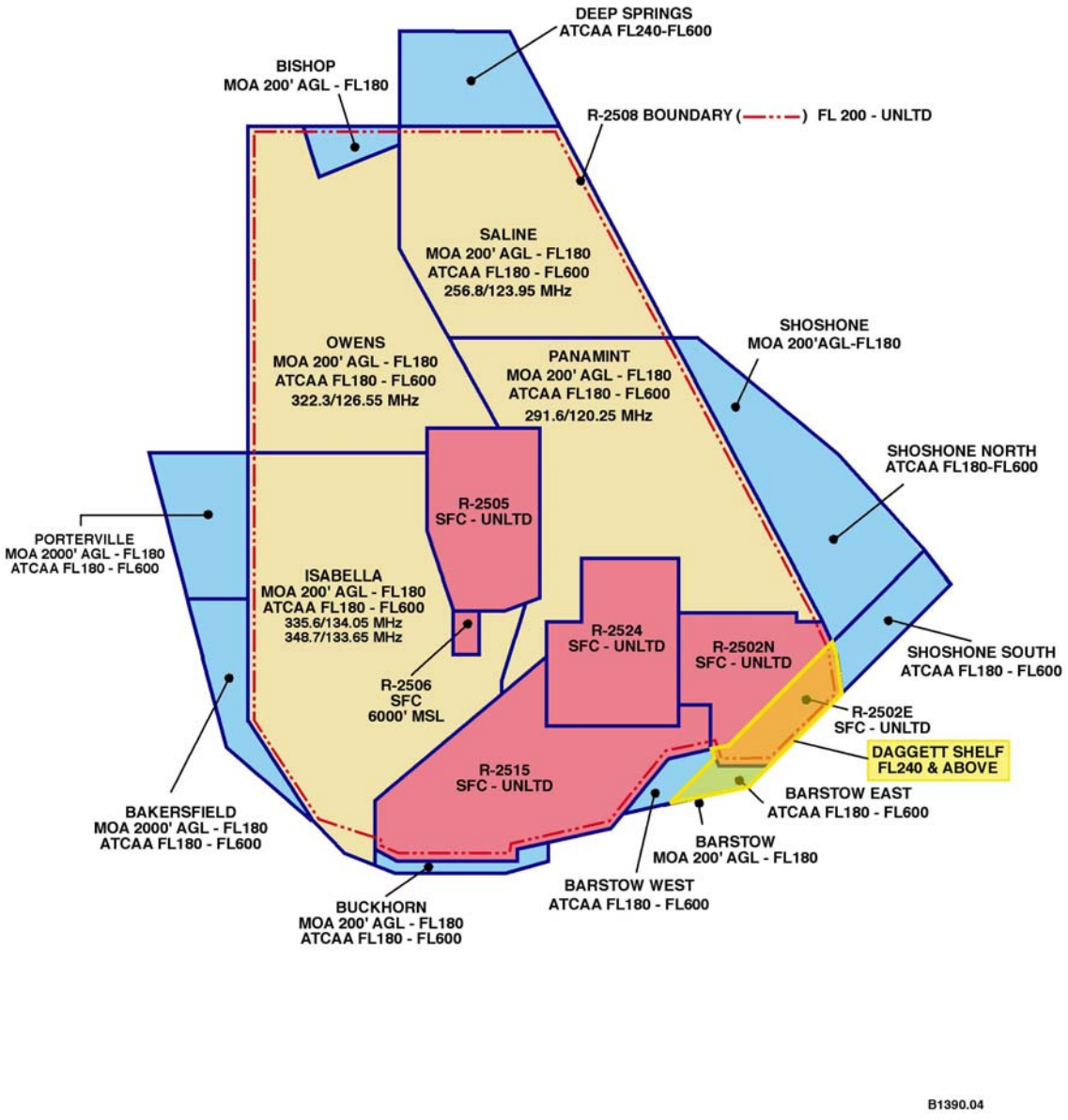

***Figure 2-3**. Overview of R-2508 Complex Airspace.*

2.2.2 Aircraft Scheduling

To schedule aircraft in the R-2508 Complex:

1. **Submit the R-2508 Complex Airspace Request Form to CCF by 1700(local) one working day prior to the date of intended use.**
2. **Submit the R-2508 Complex Airspace Request Form for weekend or holiday period events to CCF by 1700(local), the Friday before.**
   - **If the flight schedule is late, airspace/work areas may not be available due to the release of Complex airspace for joint use.**

Information shall include:

- Aircraft Call Sign
- Number and Type aircraft
- Estimated time of entry (in ZULU) into Complex airspace
- Estimated delay within Complex airspace (1+00, 1+30 etc.)
- Altitudes (highest altitude required for mission)
- Departure/Arrival airport
- Requested and/or approved airspace. Indicate work areas (MOAs/ATCAAs) **and** any internal restricted areas.
  - *Aircrews are responsible for scheduling any Internal Restricted areas with the appropriate agency.*
- Remarks
  - Type mission/activity to be conducted
  - Mission frequency, if required
  - Any MTRs, low-level or navigation routes that affect R-2508 Complex airspace. (Aircrews are responsible to schedule any route of intended use with the appropriate route scheduling agency)
  - ANY special activities (e.g., NVG/NVD, ECM, Tanking, "Lights out," etc.)

Call Signs

Call signs provided to CCF for activities in the R-2508 Complex shall not exceed 7 characters/numbers and shall be the same as filed on a DD-175. Two-letter abbreviated call signs, such as BH-1 for "Bloodhound 01," will be interpreted and broadcast as "BRAVO HOTEL 01" by Air Traffic Control (ATC). Tactical call signs shall not exceed 7 characters/numbers and shall be a pronounceable word, in accordance with *DoD FLIP, General Planning (GP), Flight Plans.*

Additions, Changes, and Cancellations

Any add-ons, call sign changes, or time slips of more than 1/2 hour before or 1 hour after the proposed time of Complex entry, NOT coordinated with CCF, are considered unscheduled events.

- If changing ***previously scheduled*** events after CCFs normal working hours (0600-1800 M-F) contact CCF duty Airspace Manager at: 1-866-805-2851.
- Changes in area that requires activation of additional airspace must be made at least 2 hours prior to activate the airspace.
  - **Notification of cancellations is required to ensure proper management and release of Complex airspace for joint use.**

2.2.3 Policy for Unscheduled Aircraft

For unscheduled aircraft, the following procedures are enforced:

1. **Fixed-wing units failing to comply with scheduling policies shall be restricted from entry/operating within R-2508 Complex airspace.**
2. IFR aircraft may encounter extensive delays or may be denied access when requesting to transit the R-2508 Complex if they are not participating aircraft.

2.2.4 Transitioning Participating Aircraft

Participating aircraft that have filed a flight plan to land at Naval Air Weapons Station (NAWS) China Lake or Edwards Air Force Base **must schedule with CCF**.

- **Failure to do so may cause the aircraft to be considered as unscheduled.**

2.3 Complex Scheduling Agencies

Units planning operations in R-2508 Complex airspace should be prepared to coordinate and schedule through one or more of the following agencies that have scheduling and operational control.

Area	Agency	Hours of Operation	Function	Contact Numbers
R-2508, MOAs & ATCAAs	R-2508 Central Coordinating Facility (CCF)	0600–1800 M-F	Complex Management, User / Pilot Briefings, Airspace Scheduling	DSN 527-2508 (661) 277-2508 Fax: DSN 527-4798 (661) 277-4798 Mobile: 1-866-805-2851 E-mail: **2508CCF@edwards.af.mil**
R-2502N / R-2502E	NTC Fort Irwin	24 hours a day	Scheduling	DSN 470-4320 / 6816 (760) 380-4320 / 6816 Fax: DSN 470-6368 (760) 380-6368
		0800–1600 M-F	Installation Aviation Officer	DSN 470-4072 / 4167 (760) 380-4072 / 4167 Fax: DSN 470-6368 (760) 380-6368
R-2505 / R-2506	NAWCWD China Lake	0700–1700 M-TH 0700–1600 Non-civilian payday Fridays	COSO Range Scheduling	DSN 437-6800 (760) 939-6800 Fax: DSN 437-6950 (760) 939-6950
			Test Management Office	DSN 437-6807 (760) 939-6807 Fax: DSN 437-6950 (760) 939-6950
			Airspace Surveillance Center (ASC) “China Control”	DSN 437-6908 / 6909 (760) 939-6908 / 6909 Fax: DSN 437-6855 (760) 939-6855
R-2515	Edwards AFB	0600–1700 M-F	Resource Operations Center	DSN 527-3940 / 4110 (661) 277-3940 / 4110 Fax: DSN 527-9685 (661) 277-9685
R-2515	Edwards AFB	0600–1530 M-F	Airspace Management Office	DSN 527-2446/ 4453 (661) 277-2446 / 4453 Fax: DSN 527-4462/5544 (661) 277-4462/5544

Area	Agency	Hours of Operation	Function	Contact Numbers
R-2524*	NAWCWD China Lake	0630–1630 M-TH	Echo Range (ECR) Scheduling	DSN 437-9128 / 9131 (760) 939-9128 / 9131 Fax: DSN 437-9152 (760) 939-9152
			Test Management Office	DSN 437-9149 (760) 939-9149
Superior Valley	NAWCWD China Lake	0630–1630 M-TH	Range Manager	DSN 437-9434 (760) 939-9434 Fax: DSN 437-9152 (760) 939-9152

R-2524 does not schedule Superior Valley Tactical Training Range.

2.4 Special Activities

Special activities are defined as operations involving one or more of the following:

- Aerial refueling
- Anchoring/Holding pattern requirements
- Air intercept/Air Combat Maneuvering (ACM) activities (5 to 10 aircraft)
- Escorted Remotely Operated Aircraft (ROA) or missile flights
- Ground control intercept (GCI) activities
- A concentration or continuous flow of aircraft
- Electronic Counter Measures (ECM) (jamming/chaff corridors; not self-protection)
- Airborne Radar Unit (ARU)/Communications link
- Tow Operations

Requests for special activities must be submitted with at least 7 working days lead time to allow all necessary coordination/changes to be approved by at least 48 hours prior to the scheduled operation.

- Lead times and approval requirements are required to allow other units to be briefed on the operation (times, routes, altitudes, activities, etc.) and deconflict the proposed operation from other activities within the Complex.
- **Appendix C: Mission Planning Checklist**, is designed to be provided to CCF in order to simplify coordination of Special Activities for missions involving 10 or fewer aircraft.

CCF has the authority to designate refueling areas, ACM areas, entry/exit routes, etc., and will coordinate the proposed operation to minimize impact on other Complex users while retaining scenario realism. Final approval authority rests with the CCB.

2.5 Scheduling Special ActivitieS

This section discusses the following special activities that are carried out within the Complex that may affect where and how other missions are flown within the Complex:

2.5.1 "Lights Out" Operations

2.5.2 Electronic Counter Measures/Chaff

2.5.3 Flares

2.5.4 Aerial Refueling

2.5.5 Supersonic Operations

2.5.6 Airborne Radar Unit (ARU)/Airborne Warning and Control Systems (AWACS) Operations

2.5.7 Tow Operations

2.5.1 "Lights Out" Operations

"Lights out" operations are allowed **ONLY within these internal restricted areas: R-2505, R-2524, R-2502N, and R-2502E**.

"Lights out" operations are NOT authorized in any other special-use airspace, including R-2508.

Units that require "lights out" operations shall contact the appropriate scheduling agency for the internal restricted area listed in Section 2.3.

- Aircrews shall advise the controlling agency when commencing and terminating "lights out" operations.
- Aircrews shall leave aircraft position lights ON while transiting to and from the scheduled restricted area. Turn lights OFF only when authorized within the internal restricted area.

A waiver to FAR 91.209 is unnecessary if the aircraft is operating in a restricted area in compliance with the using/scheduling agency's rules of operation for that internal restricted area.

2.5.2 Electronic Counter Measures/Chaff

For activities using electronic counter measures (ECM) (jamming and/or chaff) in the R-2508 Complex, you must pre-coordinate with and obtain approval from appropriate Base

Spectrum Managers. Users must also inform CCF about these activities during the scheduling process.

Spectrum Managers	DSN	Commercial
WAFC, Pt. Mugu	**351-7983**	**(805) 989-7983**
AFFTC, Edwards AFB	**527-2390**	**(661) 277-2390**
NAWCWD, China Lake	**437-6827**	**(760) 939-6827**
National Training Center, Fort Irwin	**470-3280**	**(760) 380-3280**

2.5.3 Flares

Flare use is limited to internal restricted areas only and **IS NOT** authorized in R-2508 restricted area, MOA, or ATCAA airspace. Flare use must be coordinated with the appropriate restricted area's scheduling agency.

2.5.4 Refueling Areas

The R-2508 Complex has three *unpublished* refueling areas (see Figure 2-4). These areas are available for use and must be scheduled with the Edwards AFB Resource Operations Center or CCF.

Refueling area definitions:

Area	Entry	Outbound	Latitude	Longitude	Frequency
Isabella	**PMD 345°/ 35**	**PMD 345R, left turns**	**35°13'N**	**118°04'30"W**	**234.825 MHz**
Coaldale	**OAL 155°/ 60**	**OAL 155R, left turns**	**37°00'N**	**117°33'W**	**252.175 MHz**
Shoshone	**BTY 150°/ 60**	**BTY 150R, left turns**	**35°50'N**	**116°26'W**	**272.175 MHz**

Cautions and Warnings!

For pilots operating in the vicinity of R-2508 Complex Refueling areas:

1. **Always use the "See-and-Avoid" principle throughout your refueling operations.**
2. Tanker areas are **NOT exclusive-use airspace** and are **NOT protected** from other Complex aircraft operating in the area.
3. **If you see a tanker formation that is not part of your operation, avoid the formation by at least 2,000 feet vertically and 5 miles horizontally.** This distance is used to reduce the risk of incident due to emergency breakaways or maneuvers by the tanker formation.
4. Request the status of refueling areas from High Desert TRACON (JOSHUA).
5. No radar coverage is available below 10,000 feet mean sea level (MSL) for the Shoshone and Coaldale refueling areas.

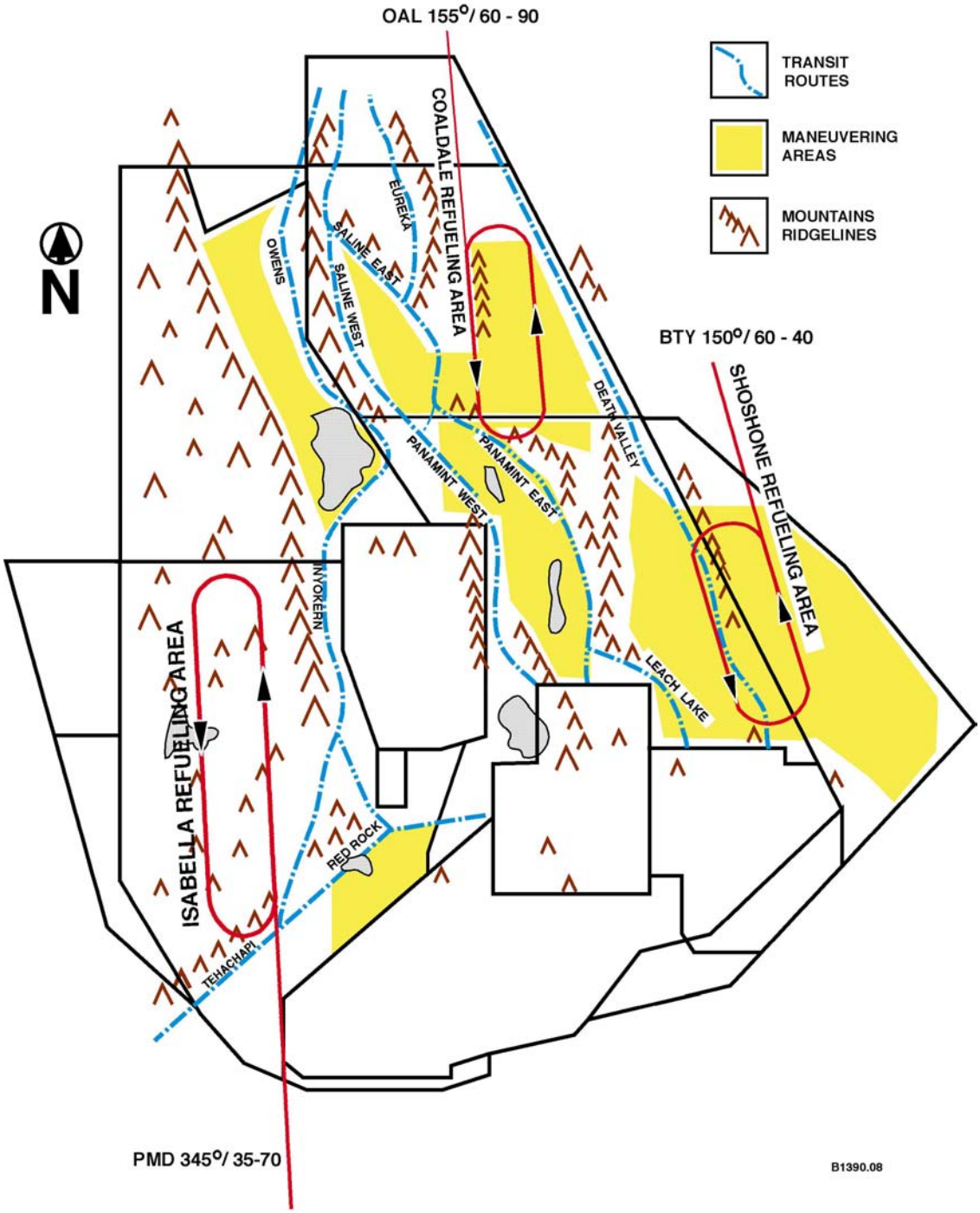

Figure 2-4. *Refueling and Maneuvering Area's and Transit Routes in the R-2508 Complex.*

2.5.5 Supersonic Operations

Supersonic flight is authorized in the R-2515 High-Altitude and Black Mountain supersonic corridors (see Figure 2-5) when properly scheduled.

Supersonic flight is NOT normally authorized in R-2508, MOAs, or ATCAAs. CCB approval is required in advance.

Supersonic operations can be conducted in other internal restricted areas after receiving specific approval from the appropriate scheduling agency.

To schedule the supersonic corridors, contact the Edwards Resource Operations Center at DSN: 527-3940 / 4110.

All supersonic flight must be reported as directed by appropriate military service directives (OPNAVINST 3710.7, AFI 13-201).

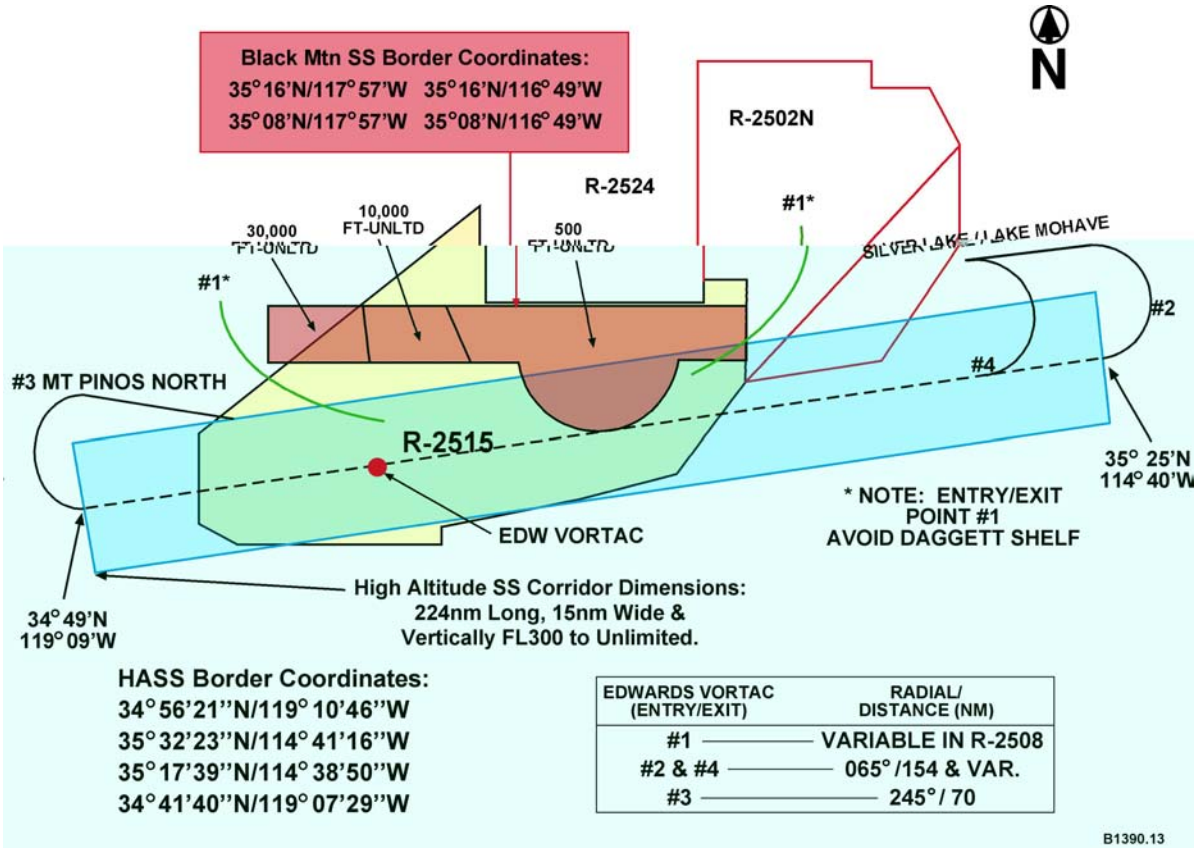

Figure 2-5. *R-2515 Supersonic Corridors*

2.5.6 Tow Operations

Three categories of towed items are allowed within the R-2508 Complex:

(a) Items towed within 500 feet of tow aircraft

(b) Items towed between 500 feet and 1 statute mile from tow aircraft

(c) Items towed more than 1 statute mile from tow aircraft

Regardless of the category, all tow operations will be scheduled with CCF. In addition, the pilot will notify the controlling agency on initial contact of intent to conduct tow operations.

The following rules apply to tow operations:

1. Tow operations are only authorized in VMC conditions. Operations involving categories (a) and (b) require advance notice to the CCF IAW Special Activities scheduling procedures. **Night tow operations are limited to category (a) only**.
2. Category (b) tow operations are considered an additional hazard in the MOAs/ATCAAs and must use a chase aircraft. The chase aircraft must remain close enough to the towed item to provide a visual cue for non-participating aircraft that the towed object is between the chase and towing aircraft.
3. Category (c) tow operations (or category (b) operations where it is not feasible to use a chase aircraft) **must** be approved by a Complex Control Board-recognized Safety Review Board (SRB) or Executive Review Board (ERB) (i.e., AFFTC, NAWCWD, or NASA). Following the SRB/ERB assessment, the project must obtain CCB approval prior to flight. **These operations also require coordination with CCF at least 24 hours prior to the mission being flown.**

WARNING! **If the towed object is inadvertently released, the towing aircraft shall notify JOSHUA immediately. User should consider avoiding populated areas within the Complex while conducting tow operations.**

2.5.7 Airborne Radar Unit (ARU) and Airborne Warning and Control Systems (AWACS) Operations

Air Force AWACS will coordinate procedures and contingency plans with participating military units to ensure compliance by mission aircraft. Navy ARUs will coordinate their procedures and contingency plans with responsible Carrier Air Wing Strike Leader.

Responsibilities for both ARUs and AWACS include:

1. Provide mission frequency to JOSHUA that enables direct contact between JOSHUA and mission aircraft.
2. Obtain orbit airspace to provide service to an exercise taking place within the R-2508 Complex. Aircrews shall:
   - Coordinate with CCF for orbits within R-2508

- Receive a Work Area Clearance from JOSHUA for orbits inside the R-2508 Complex
- Coordinate with CCF and appropriate ARTCC for orbits outside the R-2508 Complex

3. Advise JOSHUA as soon as possible when an aircraft declares an emergency or encounters any unusual situation that requires any form of special handling. Follow these procedures:
   - Initiate a radar correlation check 9Air Force AWACS).
   - Maintain communications with JOSHUA on the appropriate ATC frequency or a pre-coordinated mission/tactical frequency (AWACS/ARU).
   - Do not provide air traffic control services to mission aircraft (e.g., IFR services, ATC clearances, etc.) [AWACS/ARU].
   - Provide coordination for squawks and call signs for inbound/outbound mission aircraft [AWACS/ARU]. However, do not change the Mode 3 discrete beacon code assignment for mission aircraft working inside the R-2508 Complex. Flight split-off aircraft not assigned a Mode 3 discrete beacon code by JOSHUA may be instructed to squawk a non-discrete beacon code while in assigned mission airspace.
   - Provide mission aircraft mission support.
   - Provide JOSHUA with:
     - A 5-minute advance notice of mission completion
     - Call sign of the first element that has completed mission operations in the R-2508 Complex
     - Position of the last mission element that will exit the R-2508 Complex
   - When the mission or a mission element(s) is/are completed, advise mission aircrew(s) to remain within mission-assigned airspace and contact JOSHUA on the ATC frequency.

Responsibilities for JOSHUA are to:

1. Perform all coordination with the appropriate ARTCC for inbound/outbound mission aircraft.
2. Issue a Work Area Clearance and assign a Mode 3 discrete beacon code to mission aircraft.
3. Forward mission aircraft radar data information to the AWACS/ARU to include:
   - Aircraft identification
   - Assigned discrete beacon code
4. Inactively monitor the AWACS/ARU mission/tactical frequency.
5. Provide traffic advisories, traffic alerts on non-mission aircraft operating in the R-2508 Complex, and boundary advisories on the mission/tactical frequency.

6. **NOT** provide advisories between mission aircraft.
7. Issue departure clearances and perform all associated ATC coordination with the appropriate ARTCC.

2.6 Scheduling Large-Scale Exercises

Large-scale exercises are those involving multiple-day/multiple-range activities, more than 10 participating aircraft, and/or are very complex. All large-scale exercises using the R-2508 Complex must coordinate with CCF **at least 30 days in advance** of intended operations.

Depending on the complexity, duration, and size of the exercise area, exercise planners should expect to meet one or more of the following conditions, as determined by the CCB:

1. Provide scenario of exercise plan and airspace requirements to CCF and TRACON by message, e-mail, or fax.

   Message traffic should be addressed to:

   2508CCF EDWARDS AFB CA//

   FAA HIGH DESERT TRACON EDWARDS AFB CA//

2. Coordinate in advance with FAA (ARTCCs, TRACON), Military Representatives to FAA, CCF, and/or other special-use airspace agencies.
3. Set up a mission briefing for all participating aircrews.
4. Generate an operations plan covering detailed operating procedures to which the range agency and CCF will have direct input.
5. Serve as special frequency management liaison.
6. Brief CCB for approval or stipulations for approval, if required by CCB.

NOTE: Mission planners are ***strongly encouraged*** to take advantage of CCFs extensive knowledge and experience in coordinating complex, large-scale exercises. CCF can provide users with coordination requirements, FAA ATC and flight planning requirements and recommendations to achieve overall mission success. Early contact with CCF can prevent major changes to exercise plans.

Most large-scale exercises require the use of airspace/land ranges managed by various members of the Joint Policy and Planning Board (JPPB). Planners must formulate the desired exercise plan along with alternative options as early as possible in order to coordinate mission requirements and negotiate exercise approval.

Most airspace coordination may be handled through the agencies listed in Section 2.3. The following list of organizations that may require separate or additional coordination:

Agency	DSN	Commercial
Air Force Representative to FAA Western-Pacific Region	**833-0481**	**(310) 725-3900**
Navy Representative to FAA Western-Pacific Region	**833-1247**	**(310) 725-3910**
Army Representative to FAA Western-Pacific Region	**833-1250**	**(310) 725-3908**
Los Angeles ARTCC Military Liaison	**640-1290**	**(661) 265-8280**
Oakland ARTCC Military Liaison	**730-1595**	**(510) 745-3334**
High Desert TRACON	**527-2023**	**(661) 277-2023**

2.7 Operating Remotely Operated Aircraft (ROA)

To receive approval for Remotely Operated Aircraft (ROA, which also include UAVs and UCAVs) operations in the R-2508 Complex, submit a detailed proposal to the CCB via the CCF and the appropriate Safety Review Board (SRB) or Executive Review Board (ERB) listed in subsection 2.7.2.

All ROA operations within shared-use airspace require CCB approval that is not delegated.

The proposal should attempt to follow the basic guidelines below that are already approved by the CCB, but each program will be evaluated on a case-by-case basis and approval is contingent upon airworthiness, system maturity, and/or flight safety mitigators (e.g., flight termination system, chase, direct operator control with good comm. links to TRACON, etc.).

This section discusses CCB guidelines that will help ensure that you submit a thorough proposal in enough time for adequate review and advance coordination. If the operations are highly complex or if the proposal deviates significantly from the guidelines below, you should allow more time for coordination.

The guidelines are discussed as follows:

2.7.1 Proposal Submission Timelines

The recommended submission timelines depend on the following:

Type or Part of Program	Submittal Prior to Operations	Reason for Submittal
• Initial contact for a new program • Significant changes to an existing program	**At least 6 months**	• Coordination of Letter of Agreement (LOA)* • CCB consideration and approval
• A previously coordinated program, inactive for over 6 months	**At least 60 days**	• Coordination with CCF
• Final profile and scheduling	**At least 7 days**	• CCF will evaluate and may require schedule changes to minimize impact on other missions (see scheduling process below).
• Profile changes	**At least 3 days**	• Time to brief affected agencies. Changes not received in this time may affect airspace availability.

*LOA coordination takes at least 90 days from the original written request. The LOA depends on CCB agreement with the proposed operating procedures and the results of the Safety Review (discussed below). The LOA is usually worked concurrently with other coordination.

2.7.2 Safety Review

CCB-authorized review organization (AFFTC, NASA Dryden SRB, or NAWCWD ERB only) will review the proposal for safety in accordance with current SRB or ERB governing instructions and applicable internal range procedures.

The reviewing organization shall, at a minimum, consider the CCB guidelines established below or provide an SRB/ERB-recommended equivalent level of safety. When submitting the proposal, address the elements and mitigation's covered in the Safety Review.

This requirement also applies to operational ROAs proposing to operate within shared-use airspace.

As a minimum, all ROAs operating in shared-use airspace are expected to carry an operable transponder with mode C capability and have some demonstrable means of responding to JOSHUA requests for altitude and/or heading changes in a timely manner.

The Safety Review shall assess the following:

1. Requirement for fight termination system and written procedures addressing when it will be used. Procedures shall address at least the following:
    - Need for redundancy in transponders and flight termination system (RCC 319-92, 313-94)
    - Description of basic conditions that may result in flight termination (e.g., loss of signal, specific data link command, flight plan deviation, etc.)
    - Methodology for termination (e.g., break-apart, parachute recovery, etc.)
    - Determination that footprint from flight termination will not impact no-fly areas (see specific flight plan profile guidelines)
2. Specific flight plan (path, altitude, and speed) profiles. The profiles should:
    - Identify all affected airspace.
    - Describe methodology of controlling the ROA; e.g. man-in-the-loop, autonomous flight plan, etc.
    - Incorporate the no-fly areas (developed by CCB) to avoid direct overflight or flight termination in these areas.
    - Avoid sharp turns within 5 NM (or greater, dependent on ROAs operational limits) of the adjacent non-shared use airspace boundary. Plan for turns to be completed no less than 3 miles from the airspace boundary.
    - State those operations will remain in VMC during all flight (including chase aircraft).
    - When chase aircraft is required, it must be joined up with the ROA before leaving internal restricted areas or Class D airspace, as appropriate. If no chase aircraft, then operations may be restricted to certain airspace and/or altitude restrictions.
    - When chase aircraft is required, it must be joined up with the ROA before leaving internal restricted areas or Class D airspace, as appropriate. If no chase aircraft, then operations may be restricted to certain airspace and/or altitude restrictions.
    - Ensure that the minimum altitudes are not less than those required by this Handbook and the FARs.
    - State your willingness to operate in a “see-and-avoid” environment. Requests for exclusive use operations will normally **not** be approved in shared-use airspace (see guidance in this Handbook).
    - State operational constraints (i.e., distance from control vehicle, speeds, rate of turn, and rate of climb or descent).
    - Include procedures to change heading or altitude for traffic conflict or weather and the proposed coordination process (include timeliness of response to requested action). It is normally expected that JOSHUA can directly communicate with the

ROA controller in such a manner that changes in heading and/or altitude can be made in a timely manner.

NOTE: You may need to coordinate operations through a program representative located in TRACON. This capability should be addressed in the proposal.

- Describe sensor operations and coordination with OPSEC.
- State duration of flight.
- Identify departure and planned recovery location(s).

3. Chase aircraft requirement and procedures. Include:
   - Flight termination and ROA takeover guidance capabilities
   - Standoff distance from ROA
   - Operational limitations, if any, on the chase aircraft
   - Communications capabilities (with ground facilities and ATC)
   - Process for affecting control of the ROA (direct or via ground facility)
   - Join-up procedures, if not immediately after ROA is airborne
   - Chase aircraft and ROA operator briefing on Complex procedures
4. System maturity.
   - Describe prior operations or programs that may indicate the reliability of the system and data link in a similar configuration and operational scenario to that planned. An approved Airworthiness Certificate is a requirement for all proposed ROA configurations (this is a separate document from a "Certificate of Authorization"). Proof-of-concept flights should be, to the maximum extent possible, contained within internal restricted areas until basic airworthiness has been demonstrated.

     New concept and/or low systems maturity ROAs are expected to carry a flight termination system and be chased while operating within shared-use airspace, regardless of altitude. Demonstrated mature systems may be allowed to operate without chase or flight termination system throughout the shared-use airspace contingent upon the recommendation of the appropriate SRB/ERB and approval by the CCB.
   - Include contingency procedures (may be linked to flight termination) to address at least the following:
   - Loss of internal navigation
   - Loss of signal uplink
   - Loss of control of the ROA or the control link with JOSHUA
   - Signal interference (based on Spectrum Management review of proposed frequencies)

- Proposed resulting action or programmed response for deviations from the flight path. For ROAs that depend on a flight termination signal, address what happens when you are unable to initiate the abort process.
- Loss of tracking (position unknown)
- Loss of transponder (address redundancy requirements)
- Unsatisfactory performance: Does it create a safety hazard or is reliability downgraded?
- DoD or other directed requirement to RTB early (incomplete or interrupted flight plan)
- Loss of control van power; discuss redundancy of power supply to control van or backup unit for control
- FAA coordination/authorization and any operational restrictions that may exist

- Describe your basic recovery plan. Include security issues and coordinating access (see CCB/Land Management Agencies LOA). Address access to DoD lands (internal restricted areas) if this access is not pre-coordinated as part of the flight plan.
- Describe the need for or the accomplishment of the environmental assessment for the proposed activity.

2.7.3 Scheduling and Coordination

Once you receive CCB approval for your ROA operations, and a Letter of Agreement (if required) and all procedures have been finalized between the project, High Desert TRACON, and the CCB, **you must still coordinate and schedule individual operations in the appropriate airspace with the CCF and/or appropriate internal range scheduling activity.**

2.7.4 Post Mission Evaluation

Projects are encouraged to perform a post mission evaluation that discusses the benefits and/or constraints, of the R-2508 UAV/ROA safety review process, and report them to the CCB.

2.8 Flight Planning

Refer to ***DoD FLIP*** for flight plan filing requirements at installations located within the R-2508 Complex. All aircrews filing to land or planning to operate in the Complex must understand and operate in accordance with the R-2508 Complex concept explained in Section 3.1.2 of this Handbook.

- All scheduled operations originating outside the R-2508 Complex shall file in accordance with the following procedures unless the flight will terminate at an installation within the R-2508 Complex.

- These procedures shall be followed to ensure availability of an IFR clearance when flights are ready to RTB. Failure to comply may result in a delay in the Complex while JOSHUA attempts to obtain an IFR clearance.

Call Signs

Call signs provided to CCF for activities in the R-2508 Complex shall not exceed 7 characters/numbers and shall be the same as filed on a DD-175. Two-letter abbreviated call signs, such as BH-1 for "Bloodhound 01," will be interpreted and broadcast as "BRAVO HOTEL 01" by Air Traffic Control (ATC). Tactical call signs shall not exceed 7 characters/numbers and shall be a pronounceable word, in accordance with *DOD FLIP, General Planning (GP), Flight Plans.*

2.8.1 DD Form 175, Military Flight Plan

To file IFR to/from R-2508 Complex (see below):

1. File Two IFR flight plans or legs, one to enter and one to depart the R-2508 Complex.
2. To ensure proper flight plan processing for JOSHUA, **flights not intending to land at an airport within the R-2508 Complex should file "R-2508" as the destination and point of departure for the return flight plan/leg.**

DATE	AIRCRAFT CALL SIGN	AIRCRAFT DESIGNATION
01/01/02	TEST 01	F-22/R

TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE
I	450	NFL	1900	290	OAL.. EWALD	R-2508	0+15
I	450	R-2508	2000	290	EWALD..OAL	NFL	0+15

Figure 2-6. *Sample DD Form 175, Military Flight Plan.*

3. Aircraft landing or departing from an airport within the R-2508 Complex should file that airport as the destination and/or departure point of the flight plan.
4. The point of entry/exit into R-2508 airspace should be an R-2508 Entry/Exit fix (see Figure 2-7) as listed in subsection 2.8.2. This does not preclude ATC from clearing aircraft to enter/exit other R-2508 Complex boundary locations.

NOTE: Filing a flight plan does not relieve the aircrew of the responsibility for scheduling the appropriate airspace with CCF.

For VFR flights:

1. Obtain a Work Area Clearance from JOSHUA/SPORT before conducting operations in the R-2508 Complex.
2. All Complex aircraft shall advise JOSHUA/SPORT before departing R-2508 Complex airspace.

2.8.2 R-2508 Complex Entry and Exit Points

Name	Radial / DME	Latitude	Longitude
FAANG	NLC 043º/77	37º00'00"N	118º35'03"W
EWALD	BTY 274º/71	37º12'00"N	118º07'45"W
HAMBO	BTY 283º/50	37º12'00"N	117º38'30"W
HARNE	BTY 274º/22	36º55'30"N	117º10'33"W
JENID	BTY 175º/27	36º21'30"N	116º51'03"W
HEINY	BTY 154º/58	35º51'30"N	116º33'00"W
DAGGS	EDW 076º/38	34º58'08"N	116º57'44"W
ROSIE	PMD 317º/15	34º51'09"N	118º12'23"W
CHADS	*NID 226º/51	35º15'00"N	118º35'00"W
ROMOF	*NID 267º/44	35º49'45"N	118º35'00"W
SWOOP	NLC 075º/67	36º19'00"N	118º35'05"W
KIOTE	NLC 062º/68	36º34'20"N	118º35'24"W
MITEL	CZQ 086º/61	36º41'04"N	118º35'03"W

***NID TACAN is unmonitored when China Lake airfield is closed.**

FAA published Entry/Exit points.

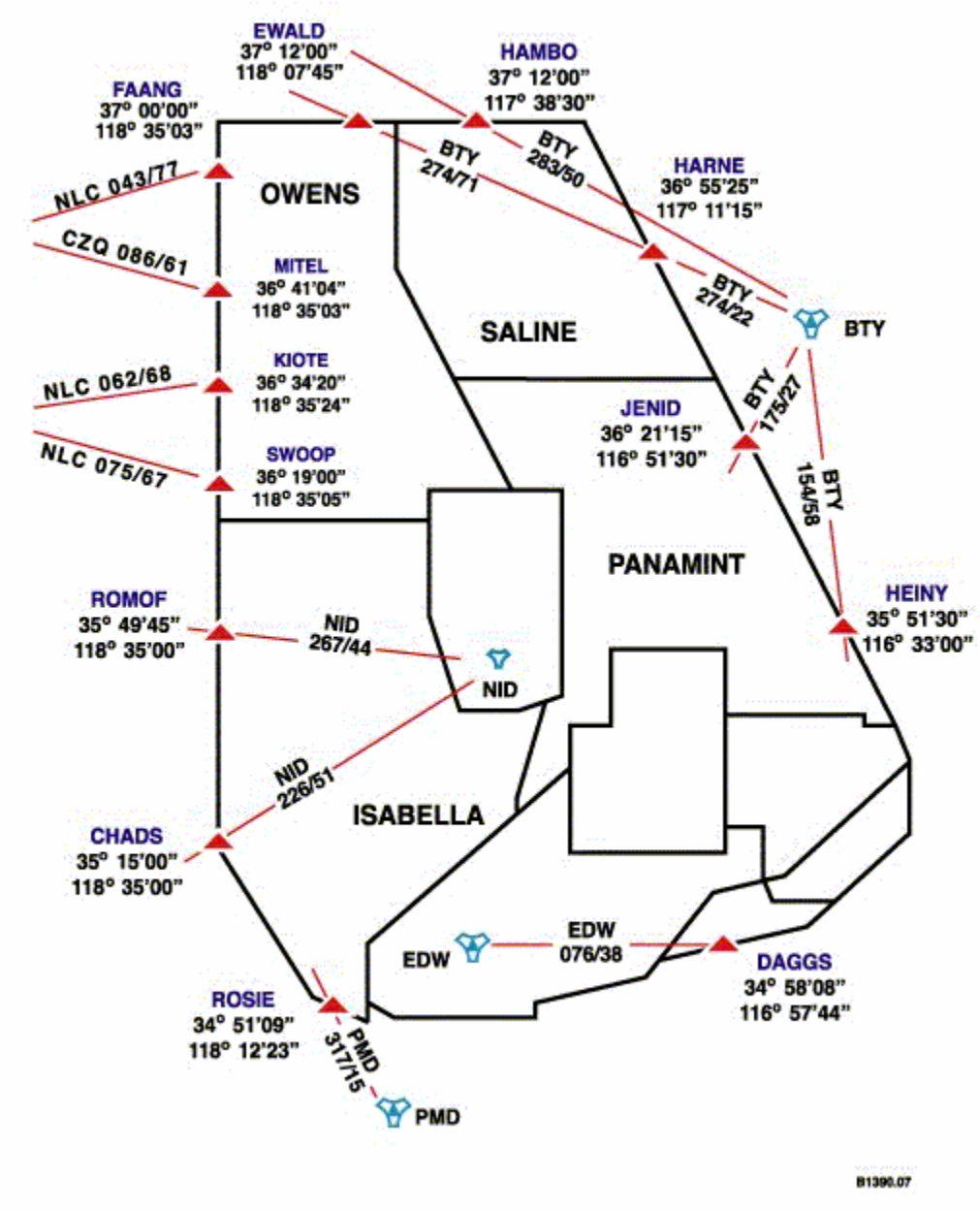

Figure 2-7. *R-2508 Complex Entry/Exit Points.*

C NATURAL RESOURCES

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C.1 SUPPLEMENTAL NATURAL RESOURCES DATA FOR R-2508 COMPLEX, R-2515 AND EDWARDS AFB

C.1.1 R-2508 Complex and High-Altitude Supersonic Corridor

The plant communities present within the R-2508 Complex and High-Altitude Supersonic Corridor (HASC) in California include Mojave Desert, coniferous forests, alpine/subalpine, foothill grassland, foothill woodland, and scrub. These are described in the following paragraphs. Certain species occur in virtually every natural habitat. Many of the common and widespread plant species are associated with the habitats described below. However, some invasive plants such as Russian thistle (*Salsola tragus*), red brome (*Bromus matritensis ssp. rubens*), tansy mustard (*Descurainia pinnata*), and split grass (*Schismus barbatus*) are common in disturbed portions of natural habitats. Other exotic species have become established in more natural areas, such as tamarisk or salt-cedar (*Tamarix* spp.).

C.1.1.1 Mojave Desert Plant Communities

Mojave Desert plant communities include creosote bush scrub, Joshua tree woodland, arid-phase saltbush scrub, halophytic-phase saltbush scrub, lake beds, and mesquite woodlands. These communities contain species that are adapted to the xeric environments of the Mojave Desert. Creosote bush scrub is dominated by creosote bush (*Larrea tridentata*) and supports relatively high plant diversity. Common associated plant species include burrobush (*Ambrosia dumosa*), winterfat (*Krascheninnikovia lanata*), cheesebush (*Hymenoclea salsola*), and Nevada tea (*Ephedra nevadensis*).

Joshua tree woodlands essentially occur within a variety of habitats, but are especially common in creosote bush scrub. The dominant species are the same as the "host" community, with the addition of Joshua tree (*Yucca brevifolia*). Joshua trees provide vertical structure to the habitat, which offers additional foraging and denning/nesting opportunities for wildlife. The understory supports a high diversity of animal species including the native desert dandelion (*Malacothrix glabrata*), pincushion (*Chaenactis* spp.), and fiddleneck (*Amsinckia tesselata*).

Arid-phase saltbush scrub is found in the most arid areas, and is dominated by allscale (*Atriplex polycarpa*). Burrobush, goldenhead (*Acamptopappus sphaerocephalus*), and cheesebush are common associates of this community. Other species that may be found in this vegetation type include Nevada tea, desert alyssum (*Lepidium fremontii*), cheesebush, goldenhead, wolfberry (*Lycium andersonii*), spiny hop-sage (*Grayia spinosa*), and bud sage (*Artemisia spinescens*).

Halophytic-phase saltbush scrub occurs in narrow bands along dry lakebeds and in claypan and dune complexes. This habitat occurs in high-pH soils, and is dominated by plant species adapted to tolerate these conditions. Common plant species of halophytic-phase saltbush scrub include shadscale (*Atriplex confertifolia*), alkali goldenbush (*Isocoma acradenia* ssp. *acradenia*), and rubber rabbitbush (*Chrysothamnus nauseosus*). The understory is composed primarily of kochia (*Kochia californica*), wild rye (*Elymus cinereus*), saltgrass (*Distichlis spicata*), goldfields (*Lasthenia californica*), and alkali pineappleweed (*Chamomilla occidentalis*).

Although essentially devoid of vegetation (except at the edges), lakebeds and other ephemeral bodies of water are an important environment for wildlife. Composed of clayey soils, this habitat type includes playas, claypans, and lakebeds. These features vary in size and morphology, and support a unique fauna adapted to seasonal inundation and desiccation. Birds, especially wading birds and waterfowl, are attracted to these areas during winter and spring migrations when inundation takes place.

Mesquite woodlands, a relatively spatially restricted habitat on Edwards Air Force Base (AFB) and the Mojave Desert, occur on more mesic washes and drainages. As with Joshua tree woodlands, the dominant species in mesquite woodlands are mesquite (*Prosopsis glandulosa*), with an understory comprising dominants found in the "host" plant community. Mesquite woodlands also provide vertical structure to the habitat, which is important to wildlife.

C.1.1.2 Coniferous Forest Plant Communities

Several coniferous forest types occur in the Sierra Nevada Range including red fir forest, yellow pine forest, mixed coniferous forest, and pinyon- juniper woodlands. Red fir forests are dominated by red fir (*Abies magnifica*), Jeffrey pine (*Pinus jeffreyi*), western white pine (*Pinus monticola*), lodgepole pine (*Pinus murrayama*), snow bush (*Ceanothus cordulatus*), bush chinquapin (*Chrysolepis sempervirens*), and quaking aspen (*Populus tremuloides*). Red fir forests are found at high elevations, between 8,000 and 9,000 feet.

Yellow pine forests are dominated by ponderosa pine (*Pinus ponderosa*), sugar pine (*Pinus lambertiana*), white fir (*Abies concolor*), big-cone spruce (*Pseudotsuga macrocarpa*), black oak (*Quercus kellogii*), and various shrub species. Yellow pine forests occur at mid-elevations, between 5,000 and 8,000 feet. Mixed conifer forests have variable species composition, but occur between the upper limits of yellow pine and the lower limits of red fir forests.

Pinyon-juniper woodlands occur between 5,000- and 8,000-foot elevations on drier mountain slopes. They comprise sparse stands of single-leaf pinyon pine (*Pinus monophylla*) and various juniper species (Juniperus spp.). Shrubs and perennial bunch grasses are often interspersed between the sparse stands of the dominant pinyon and juniper trees.

C.1.1.3 Alpine/Sub-alpine Plant Communities

Alpine/sub-alpine plant communities include sub-alpine forests and alpine habitats. Sub-alpine forests are dominated by high-elevation pines such as white bark pine (*Pinus albicaulis*), foxtail pine (*Pinus balfouriana*), limber pine (*Pinus flexilis*), lodgepole pine, mountain hemlock (*Tsuga mertensiana*), and various shrub species. Generally a comparatively low-growing and sparse woodland community, subalpine forest is limited to a few scattered localities above elevations of 9,500 feet.

Alpine habitats, also referred to as fell fields, occur at the uppermost vegetated elevations. Alpine habitats are generally dominated by a variety of low-growing herbaceous species such as sedge (*Carex* spp.) and draba (*Draba* spp.), with astragalus (*Astragalus* spp.), Indian paintbrush (*Castilleja* spp.), and penstemon (*Penstemon* spp.) comprising the common wildflowers. Fescues (*Vulpia* spp.) and bluegrasses (*Poa* spp.) are common grasses found within alpine habitats.

C.1.1.4 Foothill Grassland Plant Communities

Foothill grasslands, also known as Valley grasslands, are dominated by various grass species. This low-growing, herbaceous community is limited to the lower elevations of the western Sierra Nevada Range and the San Joaquin Valley. Prior to European settlement and widespread cultivation and urbanization of the San Joaquin Valley, the species composition of these grasslands primarily consisted of native annual and bunch grasses. Currently, native grass populations are sparsely distributed among what are predominantly non- native annual species such as brome grasses (*Bromus* spp.), oats (*Avena* spp.), barley (*Hordeum* spp.), split grass (*Schismus barbatus*), filaree (*Erodium* spp.), and mustard (*Hirschfeldia incana* and *Brassica* spp.). Natives include annual flower species such as goldfields (*Lasthenia* spp.), gilia (*Gilia* spp.), California poppy (*Eschscholtzia californica*), phacelia (*Phacelia* spp.), owl's clover (*Orthocarpus* spp.), and Indian paintbrush, and native grasses of various genera (e.g., *Achnatherum* spp. and *Poa* spp.).

C.1.1.5 Foothill Woodland Plant Communities

Foothill woodlands are dominated by oaks at lower elevations and certain pines at their upper elevations on the western side of the Sierra Nevada Range. A grassland understory is characteristic of this

community. Oak species found in this habitat include coast live oak (*Quercus agrifolia*), canyon oak (*Quercus chrysolepis*), blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizenii*), and valley oak (*Quercus lobata*). California bay (*Umbellaria californica*), currant (*Ribes* spp.), ceanothus (*Ceanothus* spp.), and buckthorn (*Rhamnus* spp.) are other foothill woodland component species.

C.1.1.6 Scrub Plant Communities

Various non-desert scrub communities are also common in this area. Scrub communities include shadscale scrub dominated by shadscale; chaparral dominated by chamise (*Adenostoma fasciculatum*), buckwheat (*Eriogonum fasciculatum*), toyon (*Heteromeles arbutifolia*), manzanita (*Arctostaphylos* spp.), and ceanothus (*Ceanothus* spp.); and sage-grass (also known as sagebrush grassland) dominated by Great Basin sagebrush (*Artemisia tridentata*), blackbrush (*Coleogyne ramosissima*), rabbitbrush (*Chrysothamnus* spp.), and antelopebush (*Purshia glandulosa*).

C.2.2.3 Plants at Edwards AFB

The five major plant communities at Edwards AFB are creosote bush scrub, Joshua tree woodland, halophytic phase saltbrush scrub, xerophytic saltbrush scrub, and mesquite woodland (Figure C-1).

Creosote bush scrub is dominated by creosote bush (*Larrea divaricata*). At Edwards AFB, there are approximately 103,000 acres of creosote bush scrub, which comprises approximately 34 percent of the base area. Creosote bush scrub is distributed throughout the northwestern and eastern portions of the base and supports the highest plant diversity on base (AFFTC 2002). Common species found in this community include winterfat (*Ceratoides lanata*), cheesebush (*Hymenoclea salsola*), and Nevada tea (*Ephedra nevadensis*).

Joshua tree woodland is dominated by Joshua trees (*Yucca brevifolia*) and is most prevalent east of Rogers Dry Lake, with small patches occurring in the northwest. At Edwards AFB, there are approximately 52,800 acres of Joshua tree woodland, which comprises approximately 17 percent of the area of the base. Common species found in this community include the native desert dandelion (*Malacothrix glabrata*), pincushion (*Chaenactis* sp.), and fiddleneck (*Amsinckia tesselata*).

Halophytic phase saltbrush scrub is dominated by four species of the genus *Atriplex*: spinescale (*A. spinifera*), shadescale (*A. confertifolia*), four-wing saltbush (*A. canescens*), and quailbush (*A. lentiformes*). At Edwards AFB, there are approximately 55,300 acres of halophytic phase saltbush scrub,

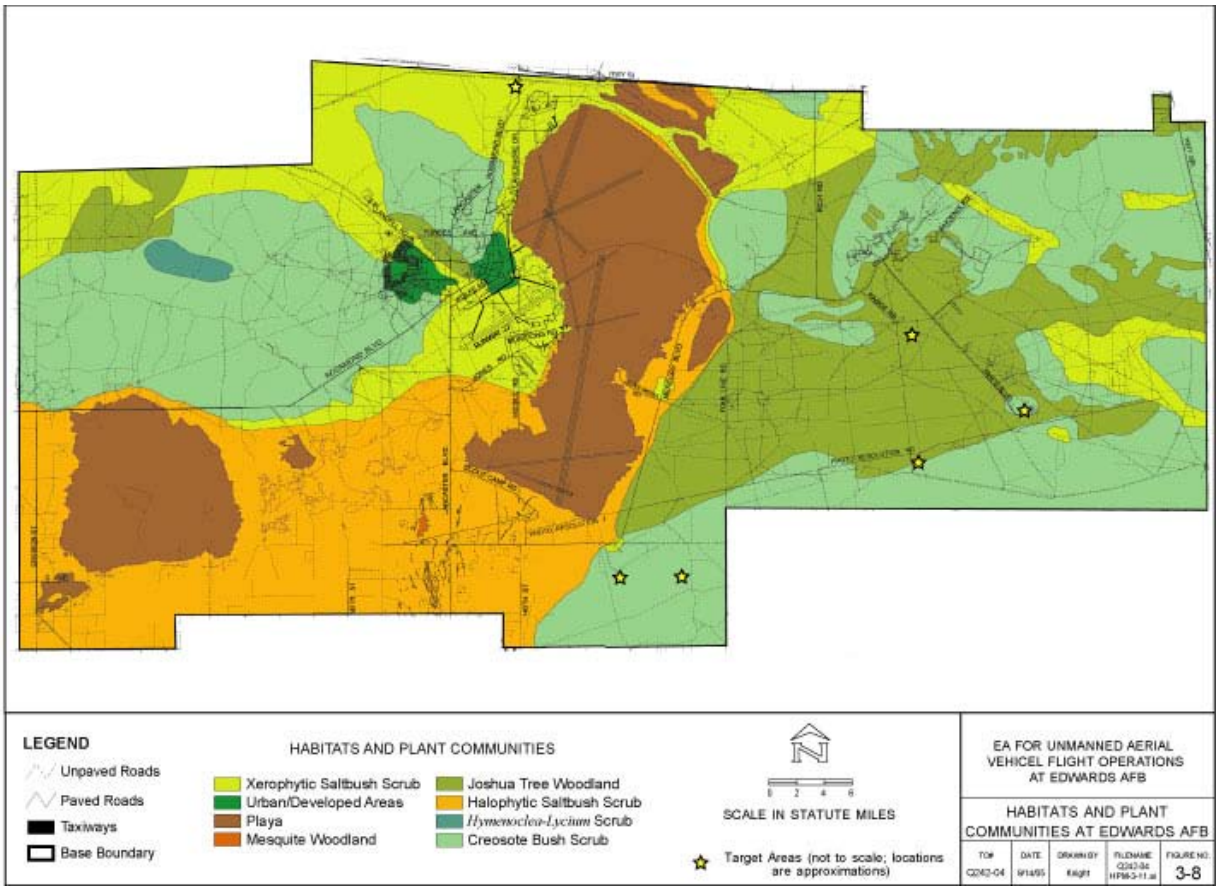

Figure C-1

Habitat and Plant Communities at Edwards AFB

which comprises approximately 18 percent of the area of the base. A common species found in this community includes saltgrass (*Distichlis spicata*).

Arid phase saltbrush is dominated by allscale (*Atriplex polycarpa*). At Edwards AFB, there are approximately 45,300 acres of arid phase saltbush scrub, which comprises approximately 15 percent of the area of the base. Common species found in this community include burrobush (*Ambrosia dumosa*), goldenhead (*Acamptopappas sphaerocephalus*), and cheesebush (*Hymenoclea salsola*).

Sensitive Plant Species

Studies of sensitive plants at Edwards AFB indicate that no federal or state-listed plant species have been identified on base. Nine species that are listed by the California Native Plant Society (CNPS), however, have been identified on base. Four of these plants are Barstow woolly sunflower (*Eriophyllum mohavense*), desert cymopterus (*Cymopterus deserticola*), alkali mariposa lily (*Calochortus striatus*), and yellow spiny cape (*Goodmania luteola*).

C.2.2.3 Wildlife

Wildlife species occurring within the ROI include those adapted to a variety of habitats. Several federally and state-protected species that may be found within the ROI are discussed in the Threatened and Endangered Species section.

Wildlife within the Mojave Desert includes native species including kangaroo rats (*Dipodomys* spp.), western pipistrelle (*Pipistrellus hesperus*), little brown bat (*Myotis lucifugus*), desert woodrat (*Neotoma lepida*), deer mouse (*Peromyscus maniculatus*), coyote (*Canis latrans*), and bobcat (*Felis rufus*). Common birds include turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), and western meadowlark (*Sturnella neglecta*). Reptiles common to all desert habitats include desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and zebra- tailed lizard (*Callisaurus draconoides*).

Birds are very mobile species and tend to occupy favored habitats within their range. Common bird species found within the Mojave Desert include red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), and white-crowned sparrow (*Zonotrichia leucophrys*). Large birds and bird flocks are known to present hazards to aircraft, typically below 5,000 feet in elevation, depending upon local terrain.

Amphibians typically found in coniferous forests include salamanders (*Batrachoseps* spp.), western toad (*Bufo boreas*), and mountain yellow-legged frog (*Rana muscosa*). Reptiles include Sierra alligator lizard (*Gerrhonotus coerulus*), rubber boa (*Charina bottae*), and western rattlesnake (*Crotalus viridis*). Bird species found throughout montane habitats in California include mountain chickadee (*Parus gambeli*), yellow-rumped warbler (*Dendroica coronata*), Clark's nutcracker (*Nucifraga columbiana*), and Williamson's sapsucker (*Sphyrapicus thyroideus*). Seasonal migrants include mountain bluebird (*Sialia currocoides*), dark-eyed junco (*Junco hyemalis*), and white-crowned sparrow (*Zonotrichia leucophrys*). Mammals commonly found in montane habitats include black bear (*Ursus americanus*), mountain lion (*Felis concolor*), and yellow-bellied marmot (*Marmota flaviventris*).

Amphibians typically found in foothill grasslands include western toad and Pacific tree frog (*Pseudacris regilla*). Reptiles include California whiptail (*Cnemidophorus tigris mundus*) and western rattlesnake (*Crotalus viridis*). Bird species found throughout San Joaquin grasslands include western meadowlark, horned lark (*Eremophila alpestris*), yellow-billed magpie (*Pica nuttalli*), and white-tailed kite (*Elanus leucurus*). Seasonal migrants include western bluebird (*Sialia mexicana*) and white-crowned sparrow.

Mammals commonly found in grassland habitats include coyote, long-tailed weasel (*Mustella frenata*), and California ground squirrel (*Spermophilus beecheyi*).

Amphibians and reptiles typically found in foothill woodlands include many of the same species found in other woodlands and grasslands. Bird species found in foothill woodland habitats include acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), great-horned owl (*Bubo virginianus*), and bushtits (*Psaltriparus minimus*). Seasonal migrants include Hutton's vireo (*Vireo huttoni*), Bullock's oriole (*Icterus bullockii*), and lark sparrow (*Chondestes grammacus*). Mammals commonly found in foothill woodlands include mule deer (Odocoileus hemionus), bobcat, and California myotis bat (*Myotis californicus*).

Amphibians and reptiles typically found in scrub include toads (*Bufo* spp.), side-blotched lizard, and western fence lizard (*Sceloporus occidentalis*). Bird species found in scrub include scrub jay (*Aphelecoma coerulescens*), wrentit (*Chamea fasciata*), Bewick's wren (*Thryomanes bewickii*), and California thrasher (*Toxostoma reduvivum*). Mammals commonly found in scrub include brush rabbit (*Sylvilagus bachmani*), gray fox (*Urocyon cineroargentinus*), and light-footed woodrat (*Neotoma fuscipes*).

Threatened and Endangered Species

A number of federally and state-listed threatened and endangered animal species are known to be present in the ROI.

The desert tortoise (*Gopherus agassizii*) is one of three tortoise species of the genus Gopherus that occur in the United States. The species is geographically divided by the Colorado River into the Sonoran and Mojave populations. The Mojave population was formally listed as threatened by the USFWS in 1990. The desert tortoise is listed as threatened by the federal government and by the State of California. It can occur throughout the Colorado and Mojave deserts in elevations up to 4,100 feet, although ideal habitat typically occurs between 1,000 and 3,000 feet (Edwards AFB 2001). The desert tortoise can occur in almost every desert habitat, but is most common in desert washes, desert scrub, creosote bush, and Joshua tree habitats. This species finds cover in burrows that are usually under bushes and requires loose, dry, sandy soil for nest building. The desert tortoise is a herbivorous reptile whose native range includes the Sonoran and Mojave deserts of southern California, southern Nevada, Arizona, extreme southwestern Utah, and Sonora and northern Sinaloa, Mexico.

Desert tortoises, known to occur within the ROI, prefer creosote scrub vegetation and firm soils for burrow construction. However, they can be found in other habitat types in relatively lower population densities. The highest densities of the desert tortoise are typically found in creosote scrub and Joshua tree woodlands, but saltbush-series vegetation also supports lower densities.

Fishes protected by endangered species regulations include the state- and federally listed as endangered Mohave tui chub (*Gila bicolor mohavensis*), Owens tui chub (*Gila bicolor snyderi*), and the Owens pupfish (*Cyprinodon radiosus*), and the state-listed as threatened cottonball marsh pupfish (*Cyprinodon salinus milleri*). The Mojave tui chub once inhabited the deep pools and slough-like areas in the Mojave River. Tui chub is the only fish native to that drainage. Populations of this fish have been transplanted to several places throughout the Mojave Desert, including the China Lake (within the R-2508 Complex). The Owens tui chub was formerly found throughout the Owens River basin in weedy shallows of spring-fed ponds and streams. Today they are found in only a few locations including a spring near Owens Dry Lake. Owens pupfish were formerly found in the Owens River system but are now found in only a few springs and ponds. The cottonball marsh pupfish is restricted to the Cottonball Marsh in Death Valley (Air Force Center for Environmental Excellence 2001).

The federally listed as threatened western snowy plover (*Charadrius alexandrinus nivosus*) inhabits shores of ephemeral lakes and perennial waters of the desert, and has been recorded at Rosamond Dry Lake on Edwards AFB and at Harper Dry Lake and Koehn Dry Lake (Air Force Center for Environmental Excellence 2001). The federally listed as threatened and the state-listed as endangered bald eagle (*Haliaeetus leucocephalus*) may winter near larger water bodies in the southern portion of the R-2508 Complex, including Harper Dry Lake. The federally listed as endangered and state-listed as threatened Yuma clapper rail (*Rallus longirostris yumanensis*) is a resident in shallow, freshwater marshes with dense stands of cattails and bulrushes. It has been recorded in the marsh of Harper Dry Lake (Air Force Center for Environmental Excellence 2001). The federally and state-listed as endangered Least Bell's vireo (*Vireo bellii pusillus*) is restricted to riparian areas containing dense willow thickets; its breeding range in the ROI is restricted to an area along the Amaragosa River. The Inyo California towhee (*Pipilo crisallis eremophila*) inhabits only the Argus Mountains of southern Inyo County. This federally listed as threatened and state-listed as endangered species requires dense willow and scrub habitat.

The Amaragosa vole (*Microtus californicus scirpenis*) is a small rodent that inhabits the Amaragosa River drainage; it is federally and state listed as endangered. Several other species of concern may occur in the Mojave Desert portion of the ROI, including the state-threatened Mohave ground squirrel (*Spermophilus mohavensis*).

Two federally listed as threatened fish species occur within the Sierra Nevada portion of the ROI. Little Kern golden trout (*Oncorhynchus aquabonita whitei*) inhabits the Little Kern River tributary of the Kern River. The Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) is a rare trout found on the eastern side of the Sierra Nevada.

One amphibian, the California red-legged frog (*Rana aurora draytonii*), a federally listed as threatened species, occurs in the foothill and montane portions of the Sierra Nevada. A state-listed as threatened reptile, the Southern rubber boa (*Charina bottae umbratrica*), inhabits an area west of Lake Isabella (Air Force Center for Environmental Excellence 2001). The American peregrine falcon (*Falco peregrinus anatum*) is state listed as endangered. This raptor (bird of prey) nests on cliffsides and on other rock outcrop areas. The great gray owl (*Strix nebulosa*) and willow flycatcher (*Empidonax trailii*) are listed as endangered by the state of California and occur in coniferous and willow riparian forests, respectively. Another state-listed as endangered bird, the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), occurs in riparian forests along the Kern River. It is also found in a small area along the Amaragosa River in the Mojave Desert.

California bighorn sheep (*Ovis canadensis californiana*), federally and state-listed as endangered, are residents of the most remote mountain wilderness areas within the ROI. Several species listed as threatened by the state of California occur within the Sierra Nevada portion of the ROI. The Kern Canyon slender salamander (*Batrachoseps stimatus*) is found only in the canyons of the lower Kern River. The wolverine (*Gulo gulo*) rarely resides in the remote high Sierra Nevada habitats. The Sierra Nevada red fox (*Vulpes vulpes necator*) is a seldom-seen nocturnal predator in this region.

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a federally listed as threatened insect distributed within elderberry- dominated drainages throughout the San Joaquin Valley. The blunt-nosed leopard lizard (*Gambelia silus*) is both state- and federally listed as endangered, and occurs in sparsely vegetated plains and foothills. The Aleutian Canada goose (*Branta candensis leucopareia*) is a federally listed as threatened species that winters in the San Joaquin Valley. The San Joaquin kit fox (*Vulpes macrotis mutica*) is federally listed as endangered and state listed as threatened, and occurs in grasslands from Tracy south to southern Kern County. The giant kangaroo rat (*Dipodomys ingens*) and Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) are both state and federally listed as endangered species. The giant kangaroo rat occurs on or just outside the western limits of the R-2508 Complex in Kern County. The Tipton kangaroo rat once ranged throughout much of the southern San Joaquin Valley. Its populations are currently restricted to just several sites in the southern portion of that valley. State-listed species occurring in the ROI include the threatened San Joaquin antelope squirrel

(*Ammospermophilus nelsoni*) found only in the southern San Joaquin Valley. Swainson's hawk (*Buteo swainsonii*) and bank swallow (*Riparia riparia*) are both listed as state threatened, and although uncommon, nest at sites throughout the San Joaquin Valley.

Kern primrose sphinx moth (*Euproserpinus euterpe*) is federally listed as threatened and is known only from a 5-acre area in the Walker Basin east of Bakersfield. The California condor (*Gymnogyps californianus*) is both federally and state listed as endangered but has been essentially extirpated from the wild. Efforts to reintroduce this species into the wild are currently underway. The Tehachapi slender salamander (*Batrachoseps stebbensi*) is state listed as threatened, with a distributional range that is restricted to an area between Piute Mountain and Tejon Pass.

Sensitive Habitats

Desert tortoise critical habitat is present within the ROI. Important habitat for desert bighorn sheep and species identified in the Threatened and Endangered Species section also occur within the ROI. Some pools and drainages are the only habitat for certain fish species, such as pupfish. Two sensitive ecological areas, as defined by the county of Los Angeles, occur within Edwards AFB: Piute Ponds, in the southwestern corner of the base, supports a significant number of waterfowl and provides a stopover area for migratory birds. Mesquite woodlands, in the south-central portion of Edwards AFB, provide a unique habitat for wildlife such as phainopepla (*Phainopepla nitens*) and loggerhead shrike (*Lanius ludovicianus*).

Five eubranchiopod shrimp species have been identified in Rogers Dry Lake: clam shrimp (*Eocyzicus digueti*), tadpole shrimp (*Lepidurus lemmoni*), and three species of fairy shrimp (*Branchinecta mackini*, *B. gigas*, and *B. lindahli*) (AFFTC 1992). Eubranchiopods lie dormant in the soil of dry lakebeds until flooding creates the aquatic habitat necessary to complete their life cycles. These shrimp are a food source for a variety of migratory shorebirds that congregate at Rogers Dry Lake when water is present.

To date, the only amphibians identified on base include the western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), red-spotted toad (*Bufo punctatus*), and African clawed frog (*Xenopus laevis*). These were identified at Piute Ponds by U.S. Geological Survey biologists during a survey in 1997. The African clawed frog is a problematic introduced species that feeds on native wildlife, including other amphibians, small reptiles, and fish (AFFTC 1997c). Common reptiles on base include the desert spiny lizard (*Sceloporus magister*), side-blotched lizard (*Uta stansburiana*), western whiptail *(Cnemidophorus tigris)*, zebra-tailed lizard (*Callisaurus draconoides)*, glossy snake (*Arizona elegans*), coachwhip (*Masticophis*

flagellum), gopher snake (*Pituophis melanoleucus*), and the Mojave green rattlesnake (*Crotalus scutulatus*).

Common birds include the turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), barn owl (*Tyto alba*), house finch (*Carpodacus mexicanus*), and western meadowlark (*Sturnella neglecta*). Joshua tree woodlands support cactus wren (*Campylorhynchus brunneicapillus*) and ladder-backed woodpecker (*Picoides scalaris*). Common bird species found in creosote scrub include the horned lark (*Eremophila alpestris*), black-throated sparrow (*Amphispiza bilineata*), and sage sparrow. The seasonal inundation of lakebeds and claypans attracts wading bird species, including the black necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), and greater yellowlegs (*Tringa melanoleuca*). Birds associated with ponds include the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), black-crowned night heron (*Nycticorax nycitorax*), and green heron (*Butorides striatus*).

Horned larks are commonly found in open habitat with sparse vegetation or areas of low shrubs (i.e., open field, agricultural areas, desert habitat, prairies, and grassland communities). The main runways on base are surrounded by arid phase saltbush scrub. Combined with open areas along the flightline, this habitat is suitable for horned larks. The vegetation adjacent to the runways is periodically graded, creating a buffer area devoid of vegetation, which also provides additional foraging habitat for horned larks. Methods that have been used at Edwards AFB to control the bird airstrike problem with horned larks include revegetation with native plants and use of a falconer. The storm water retention pond along the flightline attracts other types of birds (e.g., waterfowl and shorebirds) and possibly bats associated with aquatic habitats. Barn owls (*Tyto alba*) are known to inhabit buildings on the flightline. During the evening, owls feed on small rodents adjacent to the runways and in other areas nearby.

Common mammals on Edwards EFB include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audobonii*), and coyote (*Canis latrans*). Common rodents include the deer mouse (*Peromyscus maniculatus*), grasshopper mouse (*Onychomys torridus*), little pocket mouse (*Perognathus longimembris*), Merriam's kangaroo rat (*Dipodymus merriami*), and desert woodrat (*Neotoma lepida*). Common bats include the western pipistrelle (*Pipistrellus hesperus)*, and little brown bat (*Myotis lucifugus*).

Migratory Birds

Seasonal migratory birds use both permanent and temporary bodies of water for foraging on shrimp and other food items at Edwards AFB. These birds include ducks and geese such as the ruddy duck (*Oxyura jamaicensis*), northern mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), Canada goose

(*Branta canadensis*), and snow goose (*Chen caerulescens*). Ducks and geese are hunted in designated areas on base.

Designated Critical Habitat

In 1994, the USFWS designated portions of the base as desert tortoise critical habitat (USFWS 1994). Approximately 65,000 acres of the base fall within the Fremont-Kramer Desert Tortoise Critical Habitat Unit.

Desert Tortoise Management Zones

In 1994, the USWFS issued a Biological Opinion for the PIRA that created three Desert Tortoise Management Zones corresponding with mission use in each zone (Edwards AFB 1996). Desert tortoise critical habitat is present within the PIRA desert tortoise management zones; however, the zones extend beyond critical habitat areas. Activities within Zone 1 are not expected to preclude the recovery of the desert tortoise in the Western Mojave Desert. Moderate desert tortoise densities are expected in Zone 2. Zone 3 contains a minimal amount of PIRA support infrastructure and is expected to have minimal improvements and activities. Zone 3 provides the greatest level of protection for desert tortoises because of the high population density of desert tortoises that can be found there.

Significant Ecological Areas

The County of Los Angeles General Plan establishes 61 SEAs, which represent a wide variety of biological communities within the county. The SEAs function to preserve this variety to provide a level of protection to the resources within them. The SEAs are intended to be preserved in an ecologically viable condition for the purposes of education, research, and other non-disruptive outdoor users, but are not intended to preclude limited compatible development.

Los Angeles County has identified two SEAs on Edwards AFB: Edwards AFB (SEA #47) and Rosamond Lake (SEA #50). The locations of these SEAs are shown on Figure C-2. SEA #47 contains botanical features that are unique and limited in distribution in Los Angeles County. They include the only good stands of mesquite (*Prosopis glandulosa*) in Los Angeles County. The area contains fine examples of creosote bush scrub, alkali sink, and the transition vegetation between the two. Mesquite woodlands provide habitat for a variety of mammals, birds, and reptiles. The best example of shadscale scrub and alkali sink biotic communities in Los Angeles County are in SEA #50. It also contains Piute Ponds, which are located in the southwestern corner of the base. Piute Ponds support a variety of wildlife, especially birds. An important aspect of these ponds is that they provide a stopover area for migratory birds.

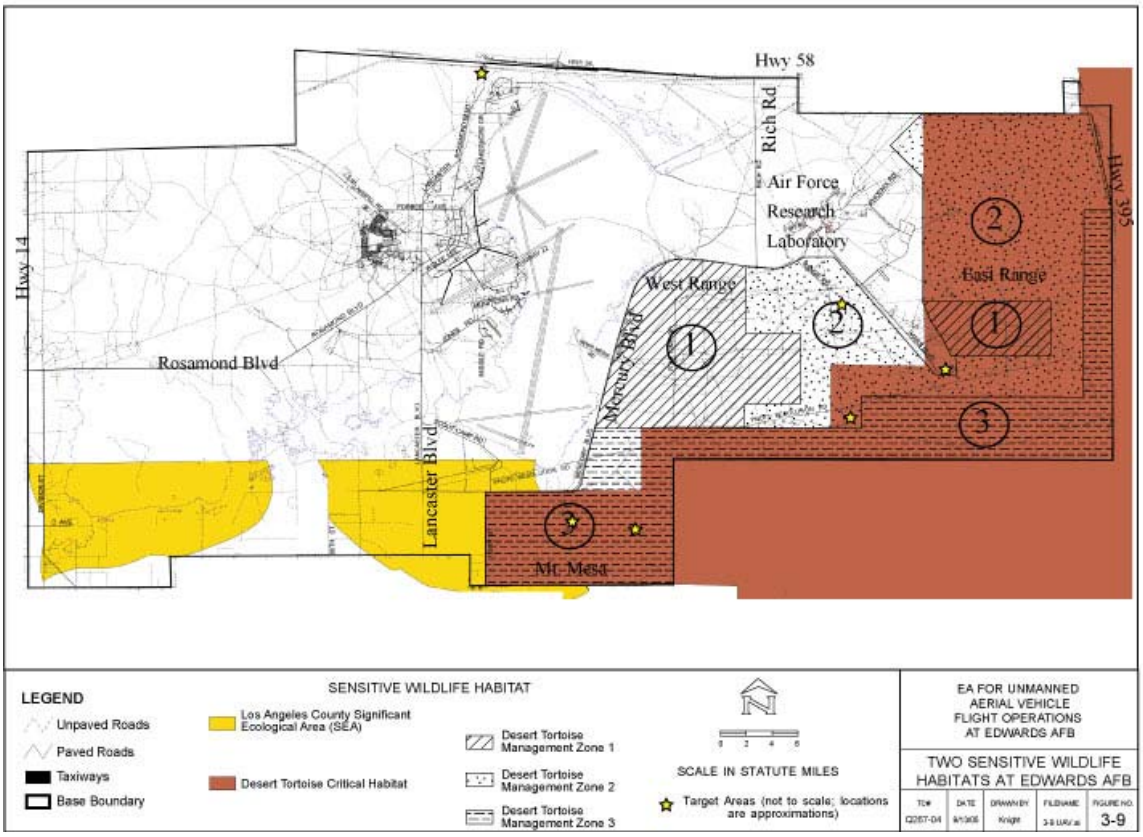

Figure C-2 Sensitive Wildlife Habitats at Edwards AFB

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C.2 NATURAL RESOURCES EVALUATION

The U.S. EPA has identified 10 ecological processes that should be evaluated to determine potential adverse effects on habitat and ecological resources.

- Habitats Critical to Ecological Processes. Loss of keystone habitats, such as desert springs, California native grasslands, Southern California coastal sage scrub, and California riparian forests and wetlands are not planned. Aircraft would use existing runways and previously disturbed areas.

- Patterns and Connectivity of Habitat Patches. Although new construction, ground disturbing activities, and changes in land use are planned, there would be no expected loss of rare habitats, loss of connectivity among habitat patches, or change in homogeneity across the landscape because these changes would be limited to the existing cantonment area.

- Natural Disturbance Regimes. No natural disturbance regimes such as fire, flood, or insect infestations, or ground disturbing activities would be expected to result from the Proposed Action or Alternatives. Increases to water sources, streams that would increase the vegetation in the desert climate, are not planned; as such additional fire sources or food sources for insects would not be expected.

- Structural Complexity. Loss or reduction of components that create structural diversity, such as coarse woody debris, Joshua trees, and downed trees; reduced structural complexity in riparian areas; and reduced complexity of micro-site structures would not be anticipated.

- Hydrologic Patterns. Changes in water chemistry, including temperature changes, reduced infiltration, increased surface flow, and wider swings in flow and increase flashiness, would not be expected. Construction activities that might alter the hydrologic patterns are not planned.

- Nutrient Cycling. Because direct or indirect contact with the habitat would be limited, a disruption of feedback loops that conserve and recycle nutrients or increase leaching of nutrients from the system, or alter levels and normal patterns of variation of nutrients would not be expected.

- Purification Services. The method by which the ecosystem breaks down waste and detoxifies contaminants and the ability of the system to process waste materials, toxics, or other contaminants would not be affected because wastes would be managed and disposed per specific federal and state guidelines.

- Biotic Interactions. Changes to the biota are not planned. Contact with sensitive species would be limited because sensitive species are not known to be present on the runways and other previously disturbed areas. Ground disturbing activities would be limited to previously disturbed areas.

- Population Dynamics. Mechanisms that tend to damp down fluctuations in populations, increase overpopulation irruptions, and cause population crashes would not be affected because of the extremely limited contact as noted above.

- Genetic Diversity. Loss of genotypes, a reduction in generic variation, and genetically based deformities and reproduction dysfunction would not be expected because activities would be limited to runways and previously disturbed areas, thus minimizing any potential for affecting genetic diversity.

D NOISE

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D.1 NOISE BACKGROUND AND ANALYSIS

The characteristics of sound include parameters such as amplitude, frequency, and duration. The decibel (dB), a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit measurement of sound. Different sounds may have different frequency content. When measuring sound to determine its effects on the human population, A-weighted sound levels (dBA) represent adjusted sound levels. The adjustments, created by the American National Standards Institute (1983), are established according to the frequency content of the sound. Examples of typical A-weighted sound levels are shown in Figure D-1.

Noise is usually defined as sound that is undesirable because it interferes with communication and hearing, is intense enough to damage hearing ability, or is otherwise annoying. Noise levels often change with time. Therefore, to compare levels over different time periods, several descriptors were developed to account for the time variances.

These descriptors are used to assess and correlate the various effects of noise on humans, including land use compatibility, sleep and speech interference, annoyance, hearing loss, and startle effects.

- A-weighted decibel scale (dBA). This scale simulates the range of sound that is audible by the human ear. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure levels for middle frequency sounds. A-weighted sound levels are typically measured between 1,000 to 4,000 hertz (Hz)

- The long-term equivalent A-weighted sound level (Leq). This describes time-varying noise energy as a steady noise level.

- Day-night average noise level (DNL). The DNL, often referred to as L_{dn}, has been adopted by federal agencies as the standard for measuring noise. The DNL is an A-weighted, 24-hour average of hourly averages. Each hourly average represents the sound energy of all the disparate sounds that occurred during that hour. The hourly average would be a continuous, uniform sound whose total sound energy would be equal to the sum of the individual sound energies of all the real sounds occurring during that hour. Typically, different hours of the day would have different hourly averages. For this

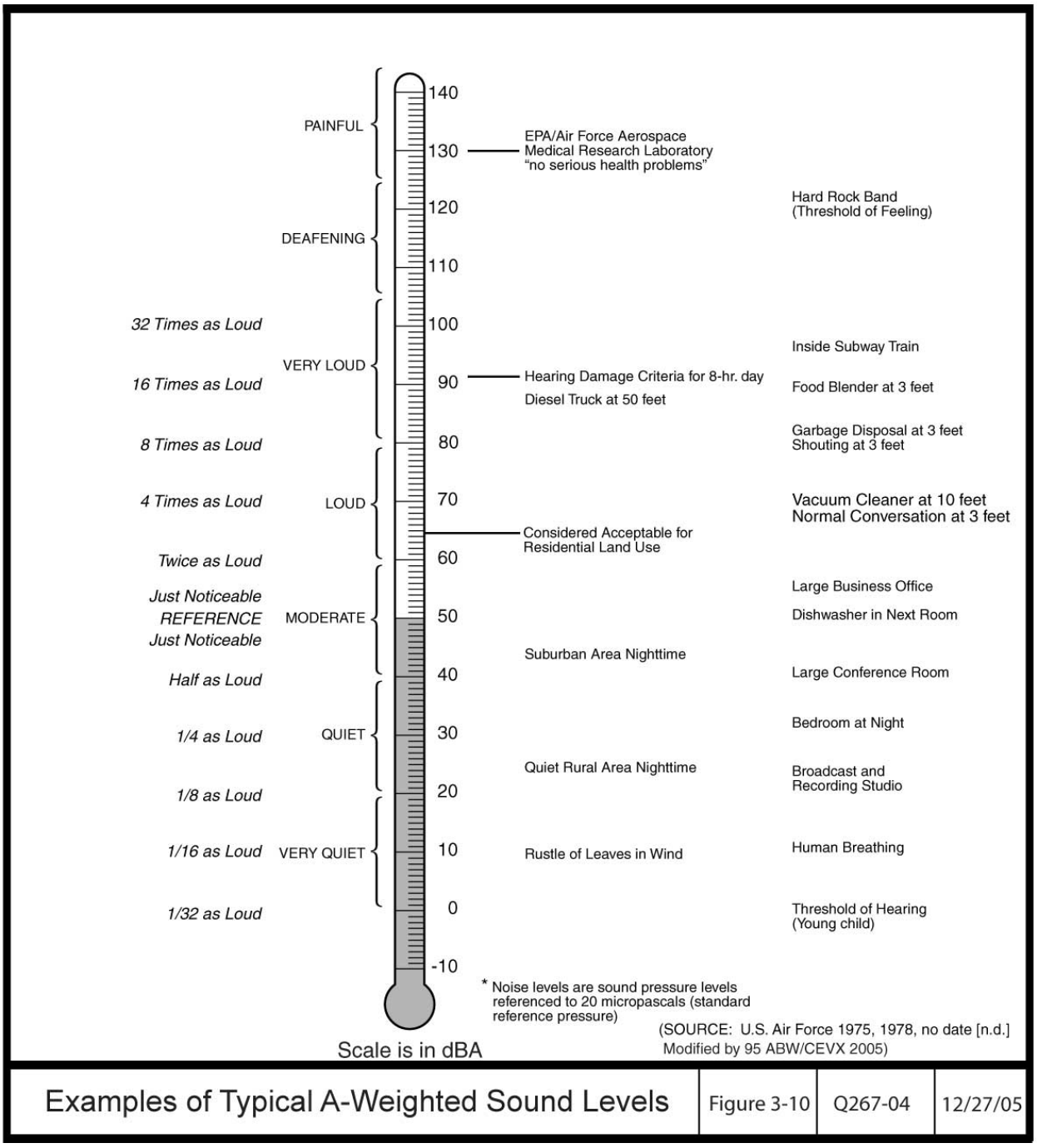

Figure D-1

Examples of Typical A-Weighted Sound Levels

reason, and for standardization, the DNL is defined as the average of the 24 hourly averages of the day.

- C-weighted sound level. C-weighting measures sound levels in dB, with no adjustment to the noise level over most of the audible frequency range except for a slight de-emphasis of the signal below 100 Hz and above 3,000 Hz. C-weighting is used as a descriptor of low-frequency noise sources, such as blast noise, explosive detonations, and sonic booms.

- C-weighted day-night level (CDNL) is the C-weighted sound level averaged over a 24-hour period, with a 10-dB penalty added for noise occurring between 10:00 p.m. and 7:00 a.m. CDNL is similar to DNL, except that C-weighting is used rather than A-weighting. CDNL is used to evaluate human response or annoyance to noise sources, such as blast noise and sonic booms.

- Sound exposure level (SEL) considers both the A-weighted sound level (AL) and duration of noise. SEL converts the total A-weighted sound energy in a given noise event with a given duration into a 1-second equivalent and, therefore, allows direct comparison between sounds with varying intensities and durations.

- C-weighted sound exposure level (CSEL) is an SEL measurement based on the C-weighted level rather than the A-weighted level.

- Sound pressure level (SPL) is a logarithmic scale, using dB as units, and a reference pressure that corresponds approximately to the minimum audible sound pressure.

- Community noise equivalent level (CNEL) has been adopted by the State of California as the descriptor for measuring noise levels. The CNEL is similar to the DNL, except that it includes a 5 dB penalty for evening noise (7:00 p.m. to 10:00 p.m.) in addition to the 10 dB "penalty" for nighttime noise.

In the Levels Document, the U.S. EPA reported that the best metrics to describe the effects of environmental noise in a simple, uniform, and appropriate way were:

- The Leq; and

- The DNL or L_{dn} (a variant of Leq that incorporates a 10-dB "penalty" for nighttime noise).

Another factor that describes how noise is characterized and analyzed is whether the noise source is continuous or impulsive. Continuous noise sources are from highways, construction sites, and cities with heavy traffic and large airports. Impulsive noise generated from munition and ordnance explosions on would be fundamentally different from the continuous noise. For example, permanent damage to unprotected ears due to continuous noise occurs at approximately 85 dB based on an 8-hour-per-day exposure, while the threshold for permanent damage to unprotected ears due to impulsive noise is approximately 140 dB peak noise based on 100 exposures per day (Pater 1976).

Thus given the difference between continuous and impulsive noise, the variations in frequency and period of noise exposure, and the fact that the human ear cannot perceive all pitches and frequencies equally well, a number of different measures of noise levels are used in this assessment: the peak sound level (dBP), the SEL, and the DNL.

1.1.1.1 Measurements of Aircraft Noise Impact on Human Annoyance

In 1977, at the request of the U.S. EPA, the National Academy of Science's Committee on Hearing, Bioacoustics and Biomechanics (CHABA) proposed guidelines for the uniform description and assessment of the various noise environments associated with various projects. In 1982, the U.S. EPA published *Guidelines for Noise Impact Analysis*, based on the CHABA Guidelines. According to CHABA Guidelines, the Leq and DNL were selected as the appropriate descriptors for noise because they reliably correlate with health and welfare effects. From data on community social surveys, DNL has been found to correlate with community annoyance, as measured in terms of percentage of exposed persons who are "highly annoyed" (%HA) (Table D-1).

Correlation between DNL and CDNL has been established based on community reaction to impulsive sounds (CHABA 1981). The DoD has followed the recommendations of CHABA in describing high-intensity impulsive sounds, such as explosions, in terms of C-weighted sound exposure level. Table D-1 shows the relationship between the percent of the population highly annoyed by sound levels expressed as DNL and CDNL.

Table D-1
Relationship Between C-Weighted and A-Weighted Sound Levels and Percent of the Population Annoyed

CDNL (C-weighted)	% Highly Annoyed	DNL (A-weighted)
48	2	50
52	4	55
57	8	60
61	14	65
65	23	70
69	35	75

Note: CDNL can be interpreted in terms of "equivalent annoyance" DNL.

Source: CHABA 1981

A DNL of 65 dBA or lower is considered to be acceptable (Table D-1); a DNL above 65 dBA but not exceeding 75 dBA is normally unacceptable unless some form of noise attenuation is provided; a DNL higher than 75 dBA is unacceptable. Daily exposure to explosions with a CDNL of 61 dB or less is comparable to the DNL 65 dBA significance level for non-impulsive noise.

Explosion noise levels measured as a CSEL also provide a metric for potential impacts to humans over a short-term duration, rather than averaged over a 24-hour period. For example, CSEL values can be used to evaluate potential physiological startle responses and other short-term annoyance factors. Table D-2 shows the relationship among CSEL, peak SPL, and SEL.

Table D-2

Relationship Between SEL, Peak dB, and CSEL

CSEL (dB)	Peak SPL (dB)	SEL (dB)
85.4	113.6	75.9
94.0	121.6	84.5
100.4	127.6	90.9
106.9	133.6	97.4
110.7	137.1	101.2
113.4	139.6	103.9
115.5	141.6	106.0
117.2	143.1	107.7
119.9	145.6	110.4
121.9	147.6	112.4
123.6	149.2	114.1
125.1	150.5	115.6
127.4	152.7	117.9
129.3	154.4	119.8
130.9	155.9	121.4
132.2	157.1	122.7

1.1.1.2 Measurements of Noise Impact on Land Use Compatibility

In 1980, the Federal Interagency Committee on Urban Noise (FICUN) published guidelines for considering noise in land use planning (FICUN 1980). Federal agencies have adopted these guidelines as the standard when making recommendations to local communities on land use compatibility issues. Table D-3 shows the types of land uses that would be appropriate based on a range of DNL values.

Again, a DNL of 65 dBA or lower is considered to be acceptable (Table D-3); a DNL above 65 dBA but not exceeding 75 dBA is normally unacceptable unless some form of noise attenuation is provided; a DNL higher than 75 dBA is unacceptable. Daily exposure to impulsive noise of CDNL of 61 dB or less is comparable to the DNL 65 dBA significance level for non-impulsive noise and is normally considered compatible with most land uses (Table D-1).

Table D-3
Land Use Compatibility

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoria, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N

Table D-3 (Continued)

Land Use Compatibility

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Table D-3, Page 2 of 3

Notes: Numbers refer to notes below.

* - The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

Y (YES) - Land Use and related structures compatible without restrictions.

N (No) - Land Use and related structures are not compatible and should be prohibited.

NLR - Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 - Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

Table D-3 (Continued)

Land Use Compatibility

Notes: (Continued)

1 - Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2 - Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.

3 - Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

4 - Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

5 - Land-use compatible provided special sound reinforcement systems are installed.

6 - Residential buildings require an NLR of 25.

7 - Residential buildings require an NLR of 30.

8 - Residential buildings not permitted.

Source: 14 CFR Part 150

Figure D-2 shows the cumulative noise levels for restricted area R-2515. The Ldn does not exceed 60 dB.

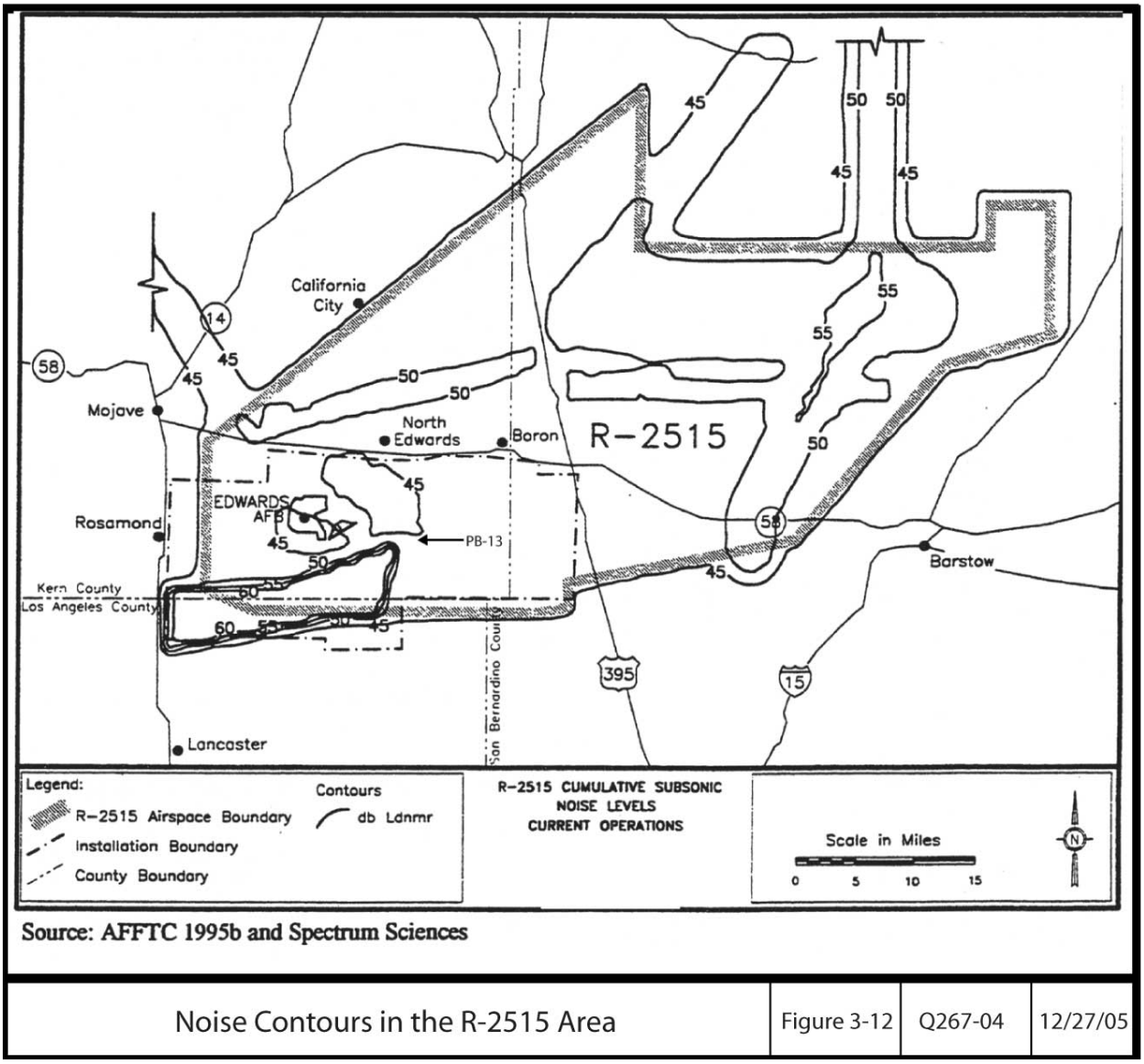

Figure D-2

Cumulative Subsonic Noise Levels for R-2515

D.2 NOISE

In 1972, Congress enacted the Noise Control Act (NCA), Public Law 92-574. Among the requirements under NCA was a directive to the U.S. EPA to "…publish information on the levels of environmental noise, the attainment and maintenance of which in defined areas under various conditions as requisite to protect the public health and welfare with an adequate margin of safety." The U.S. Environmental Protection Agency (U.S. EPA) published EPA-550/9-47-004, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, in 1974 (Levels Document) (U.S. EPA 1974). The characteristics of sound are addressed in Appendix D, Noise Background and Analysis.

D.2.1 Existing Conditions in R-2508 Complex

The land under the R-2508 Complex consists primarily of open space, but includes industrial, residential, commercial, and public/recreation centers as well. Noise estimates are usually presented as noise contours. Noise contours are lines on a map of an airfield and its vicinity where the same noise level is predicted to occur. The 5-decibel (dB) interval chosen to represent noise contours reflects the Department of Housing and Urban Development (HUD) noise criteria commonly used for airfield noise.

Road noise varies from 60 to 90 A-weighted decibel (dBA) depending on the type and quantity of traffic. The Military Operations Area (MOA) Range NOISEMAP (MR_NMAP) noise model was used to develop the ambient noise contours for the R-2508 Complex. The models in MR_NMAP together are representative of the way aircraft fly in military airspace. There are three general representations: broadly distributed operations that generally occur in MOAs and ranges, distributed parallel tracks that occur along military training routes, and specific tracks that occur in target areas. The noise models contained in MR-NMAP assume operations in MOAs and restricted airspace areas are uniformly distributed which accounts for noise contours following the borders of the airspace (Lucas and Calamia 1996).

The total noise contours include the effects of distributed aircraft operations and that of low level and other test routes that lie within the R-2508 Complex. The day-night sound levels on the A-weighted decibel scale (L_{dn}) noise contours resulting from subsonic aircraft operations range from 45 to 60 dBA (up to 65 dBA at Ft. Irwin) within the R-2508 Complex (95 ABW and AFFTC 2005). The ambient noise levels around military airfields range from 45 dBA to 80 dBA, but lie completely within the base boundaries. Sensitive noise areas within the R-2508 Complex are shown in Figure 3-3. This figure summarizes the noise receptors as associated with land use for national and state parks, national forests,

recreational areas, cities, and incorporated areas including schools, hospitals, and residential areas. Additional detailed information can be found in the *R-2508 Complex Environmental Baseline Study* (95 ABW and AFFTC 2005a).

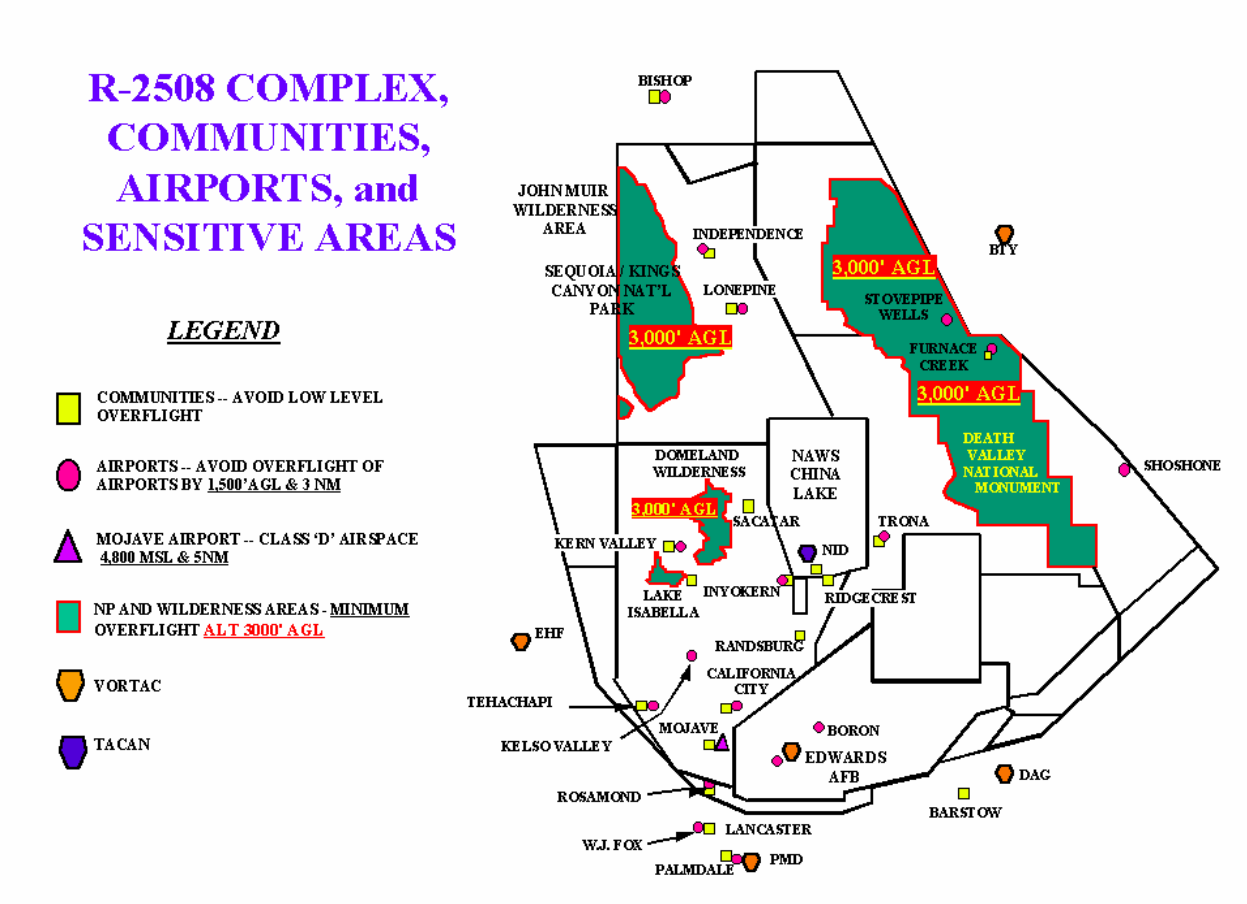

Figure 3-3

Sensitive Noise Areas in the R-2508 Complex

D.2.2 Existing Conditions Restricted Area R-2515 and Edwards AFB

The L_{dn} noise contours resulting from subsonic aircraft operations in restricted area R-2515 range from 55 dB L_{dn} to less than 45 dB L_{dn} (95 ABW and AFFTC 2005a); therefore no noise above 60 dB L_{dn} would be expected in restricted area R-2515. The highest noise levels are found in the area of Cords Road, the Alpha Corridor, and the Precision Impact Range Area (PIRA).

Noise contours for Edwards AFB as shown in Figure 3-4 were updated in 2004. The noise is highest around the airfield, NASA DFRC, and industrial areas. The noise levels near the residential areas and at the perimeter of the Base remain below 65 dB Community Noise Equivalent Level (CNEL).

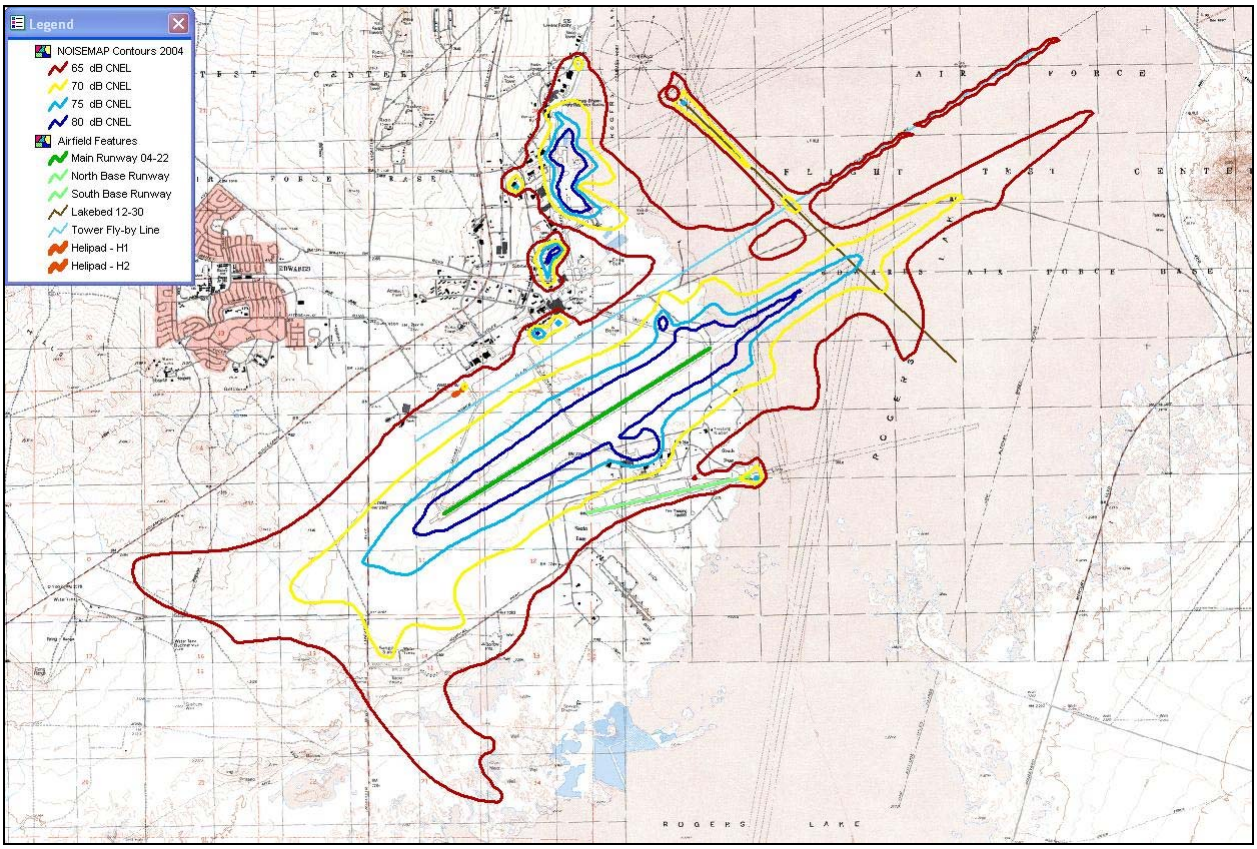

Figure 3-4

Noise Contours at the Runways at Edwards AFB

D.2.3 Noise From Sonic Booms

Noise from sonic booms is addressed in the *Environmental Assessment to Extend the Supersonic Waiver for Continued Operations in the Black Mountain Supersonic Corridor and Alpha Corridor/Precision Impact Range* (AFFTC 2001) and the *Environmental Assessment for the Continued Use of Restricted Area R-2515* (AFFTC 1998b). Supersonic noise in the R-2515 restricted airspace is generated from supersonic flight operations occurring in the Black Mountain and High Altitude supersonic corridors and Alpha Corridor/PIRA area. The predicted cumulative noise level contours for current operations in these corridors are based on 1999–2000 data. Aircraft traveling at or above sonic velocity produce sonic booms with a noise level of 61 dB L_{cdn} and below within restricted area R-2515 (95 ABW and AFFTC 2005a). It was estimated that approximately 740 supersonic flights were conducted on the Edwards supersonic corridors in 1999. Of those flights, 10 supersonic flights occurred between 500 feet AGL and 10,000 feet above MSL, 151 supersonic flights occurred between 10,000 and 30,000 feet above MSL, and 579 supersonic flights occurred above 30,000 feet above MSL. Overpressures for the majority of sonic

booms run a nominal 1.3 pounds per square foot (psf) (AFFTC 2001). Two factors that help determine the levels of annoyance for sonic booms are frequency and sound level. Table 3-4 shows the relationship between C-weighted and A-weighted sound levels and the percent of population annoyed. Figure 3-5 shows the level of acceptability for sonic booms based on the frequency and peak overpressure.

Table 3-4

Relationship Between C-Weighted and A-Weighted Sound Levels and Percent of the Population Annoyed

CDNL (C-weighted)	% Highly Annoyed	DNL (A-weighted)
48	2	50
52	4	55
57	8	60
61	14	65
65	23	70
69	35	75

Notes: CDNL - C-weighted equivalent of DNL
DNL - day-night average noise level (A-weighted)

Source: Committee on Hearing, Bioacoustics and Biomechanics, Assembly of Behavioral and Social Sciences 1981

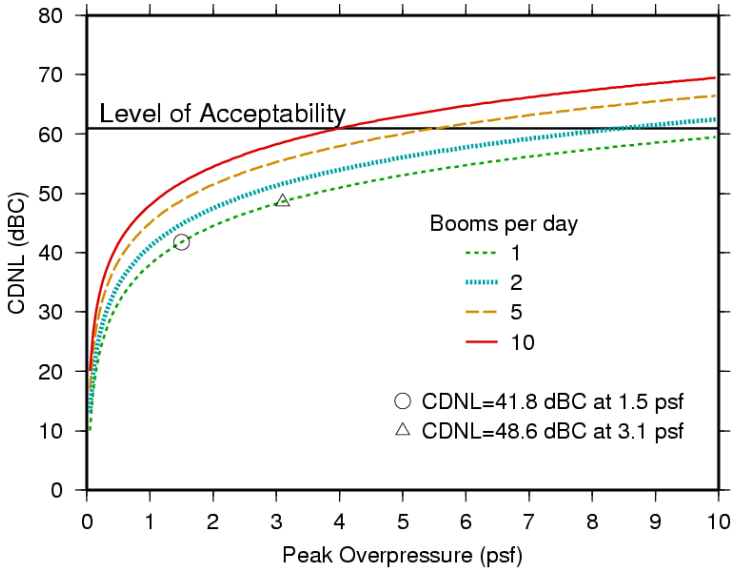

Figure 3-5

Relationship of CDNL to Peak Overpressure and Number of Daytime Sonic Booms

D.3 NOISE

The primary impacts on noise for the Proposed Action and Alternatives would be from aircraft, support equipment, and during the major or minor MILCON. The noise contribution from subsonic flight operations at Edwards AFB resulting from a 20 percent increase in flight operations would increase the accepted day-night average noise level (DNL or L_{dn}) by less than 1 dB over current levels. Noise contributions by aircraft traveling faster than the speed of sound would also add to the C-weighted impulse noise. The threshold level of acceptability for impulse noise impacts is based on the CDNL (L_{cdn}) of 61 dBC. Predicted CDNL levels at Edwards AFB and within restricted area R-2515 would be below L_{cdn} 57.5 dBC (AFFTC 1998b). If 20 percent of the additional aircraft flights exceeded the speed of sound, than an increase of less than 2 percent of supersonic flight activity would be predicted, which would still be below the threshold level of acceptability.

D.3.1 Data and Assumptions Used in the Analysis

D.3.1.1 Subsonic and Supersonic Noise

The HUD considers exterior sound levels with a DNL of 65 dBA as acceptable and allowable. The measure CNEL itself is essentially the same as DNL except for the method of treating nighttime noises. In CNEL, the 24-hour period is broken into three periods: day (7:00 a.m. to 7:00 p.m.), evening (7:00 p.m. to 10:00 p.m.), and night (10:00 p.m. to 7:00 a.m.). Weightings of 5 dBA and 10 dBA are applied to the evening period and night period, respectively. For most time distributions of aircraft noise around airports, the numerical difference between a two-period and three-period day is not significant, accounting for several tenths of a decibel at most (U.S. EPA 1974).

The Federal Interagency Committee on Noise policy recommends that if screening analysis shows noise levels at noise-sensitive areas (e.g., schools, churches, hospitals) will be at or above a DNL 65 dBA and will have an increase of DNL 1.5 dBA or more, further analysis should be conducted for noise-sensitive areas between DNL 60 and 65 dBA where there is an increase of DNL 3 dBA or more due to the proposed noise exposure. Since the increase in subsonic sound levels would be less than 1 dB (30 percent of the level that would trigger a requirement for further analysis), the increase resulting from additional flight operations would not be expected to create any significant impacts on subsonic noise.

Impulse noise from sonic booms is measured differently than subsonic noise. A C-weighted DNL (CDNL or L_{cdn}) value of 61 dBC for impulse noise is equivalent to a DNL value of 65 dBA as shown on Table 3-4. Aircraft traveling faster than the speed of sound produce sonic booms with noise levels that

are predicted to be predominantly less than L_{cdn} 55 dBC within the R-2515, with the highest predicted noise levels of L_{cdn} 57.5 dBC over north–central R-2515 where the Black Mountain Supersonic Corridor and High Speed Supersonic Corridor overlap (AFFTC 1998b). Figure 3-5 shows that up to 5 sonic booms per day would be below the acceptable threshold if the intensity of the sonic boom on the ground was below approximately 5.50 psf. The normal overpressure for sonic booms at Edwards AFB is nominally around 1.3 psf (AFFTC 2001). From 1980 to 1999 there was an average of 607 supersonic flights conducted annually over Edwards AFB and in the designated supersonic flight corridors. In 1999, approximately 3 percent of the total aircraft flights were supersonic. Of the aircraft listed in Table 2-1, 3,420 flight operations could be flown by supersonic capable aircraft. Consequently, if one assumed a 9 percent increase in flight operations, then an additional 55 supersonic flights would occur annually, with a daily average (based on 270 flying days per year) of 3 (2.45 sonic booms rounded to the next whole number), which is 40 percent below the acceptable level of 5 sonic booms per day. Consequently, it could be reasonably assumed the noise from the sonic booms from the additional flight operations would be below the threshold for the level of acceptability.

D.3.1.2 Construction Related Noise

For the purpose of this assessment, construction related noise would be localized or regional. Localized noise impacts are those that occur within or adjacent to the project construction site and regional impacts would refer to those occurring at offsite locations (e.g., Rosamond Drive, Highway 58, Highway 14, or U.S. Highway 395 due to the increase in traffic). Construction impacts would be temporary in duration and would be associated with the construction activity and typically last one year or less and would have no permanent effect on the ambient noise level. Construction-related noise typically occurs intermittently and varies depending upon the nature or type of construction (e.g., demolition, land clearing, grading and excavation, or erection of a structure). Noise generated by construction equipment including earth movers, material handlers, and portable generators can reach high levels. Although noise ranges tend to be similar for all construction phases, the grading phase tends to involve the most equipment and highest noise levels. The U.S. Environmental Protection Agency (USEPA) has found that the noisiest equipment types operating at construction sites typically range from 88 dBA to 91 dBA, at a distance of 50 feet from the source of the noise. Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at a lower setting (USEPA 1971). Noises from a construction site typically decrease 6 dBA for each doubling of distance from point source to the receptor. Given this noise attenuation rate, and assuming no noise shielding from either natural or man-made features, outdoor receptors within approximately 1,600 feet of a construction site could experience maximum instantaneous noise levels

greater than 60 dBA when on-site construction related noise levels are approximately 90 dBA. Due to the noise-generation potential of construction projects, activities occurring during more noise sensitive evening and nighttime hours would be of increased concern when evaluating noise levels generated by construction activities. Because exterior ambient noise levels typically decrease during the late evening and nighttime hours, due to decreased community activity, construction activities being performed during these more noise sensitive periods can result in increased annoyance and potential sleep disruption to occupants of nearby residential dwellings. Depending on the time of day during which construction activities occur, nearby noise sensitive receptors could experience noticeable increases in ambient noise levels. As a result, short term increases in ambient noise levels associated with the proposed action would be considered local, short-term, moderate, and adverse under NEPA. To reduce the potential moderate adverse significance to less than significant, mitigation measures would be implemented if Alternative A or B is implemented.

D.3.2 Alternatives Considered

D.3.2.1 Alternatives A, B, and C

R-2508 Complex and Restricted Area R-2515

Based on the number of flight operations that occur annually within the R-2508 Complex, the addition of up to 5,200 aircraft flights would represent a 13 percent increase in total flight operations over 2006 levels. As shown in the *Environmental Assessment for Continued Use of Restricted Area R-2515* (AFFTC 1998b), adding the F-22 flight test program with over 6,500 F-22, F-16, and support aircraft flight operations showed a potential noise level increase of 6 percent, which would result in no significant noise impacts. Therefore, one could reasonably assume that adding less than 5,200 flight operations for other similar types of aircraft would also result in less than significant noise impacts (AFCEE 2001). Therefore, based on Federal Interagency Committee on Noise policy, the increase in subsonic noise resulting from up to 5,200 flight operations would not require further evaluation and it could reasonably be concluded that no significant impacts on noise would result from the additional flight activity.

Edwards AFB

The potential impact of up to 5,200 additional aircraft flights annually would represent a 33 percent increase in flight operations at Edwards AFB (AFFTC 2006) over current levels but would still be less than the flight activity experienced in the 1980s and 1990s. The predicted SEL for various aircraft similar to aircraft that may be used as test aircraft are shown in Table 4-8.

Table 4-8

Predicted SELs for Surrogate Aircraft

Aircraft Type	200 feet AGL (dBA)	500 feet AGL (dBA)	> 85 dBA
A-10	104.9	97.6	1,600 feet AGL
F-15	123.6	117.0	10,000 feet AGL
F-16	129.5	122.2	14,000 feet AGL
F-22	121.3	114.5	8,000 feet AGL

Source: SELCal 2006

These representative aircraft (except for the A-10) shown in Table 4-8 routinely operate from Edwards AFB. Adding these additional flights would cause an increase in the DNL; however, since the increase in subsonic noise would be less than the 2-dB DNL noise threshold increase that would require updating an Air Installation Compatible Use Zone study, an update would not be required. As shown on Figure 3-4, residential areas are well beyond the 65 dB CNEL contours.

Noise Impacts on from Flight Operations Exceeding the Speed of Sound and Subsonic Operations

The impact on noise from supersonic flight operations would be expected to be below the threshold level of acceptability; thus, no specific mitigation would be required. The current 65-dBA CNEL contour as shown in Figure 3-4 is contained entirely within the base boundary at Edwards AFB. Therefore, a less than 1-dBA increase in DNL would not be expected to significantly increase the CNEL contours, which would remain within the base boundaries, and no mitigation would be required.

Noise Impacts on Wildlife

A wide range of impacts on wildlife due to aircraft overflights has been reported in literature. Behavioral responses are highly variable depending on the method of study, species in question, special and temporal parameters, and other characteristics (95 ABW and AFFTC 2005b).

After years of study on the effects of noise on natural resources, the information and data collected do not support the contention that noise generated by aircraft harms biological resources (95 ABW and AFFTC 2005b). However, the effects of military flight operations on wildlife can be summarized:

- There is no evidence to support the conclusion that noise and sonic booms associated with military overflight activities have a negative effect on populations of wild animals;
- Habituation to aircraft noise occurs with most species.

D.3.2.2 Significance/Mitigation Measures for Noise Impact in the R-2508 Complex

Aircraft will maintain a minimum altitude of 3,000 feet AGL vertically and 3,000 feet laterally when flying near the noise sensitive areas in the R-2508 Complex as described in the *R-2508 Environmental Baseline Study* (95 ABW and AFFTC 2005a). This would include flight operations in the Isabella, Owens, Panamint, and Saline work areas that overlie several land management areas including:

- Sequoia-Kings Canyon National Park;
- John Muir Wilderness;
- Domeland Wilderness (1977 boundaries); and
- Death Valley National Park (boundaries as designated for Death Valley National Monument in 1994).

Low level operations over the Sequoia National Forest are also limited from May 23 to September 30 after 8:00 p.m. on all Friday, Saturday, and Sunday nights, and during the Memorial Day, Independence Day, and Labor Day weekends. This excludes mission essential flights that have been coordinated with the Central Coordinating Facility at least 3 working day prior to the low-level flight.

D.3.2.3 Significance/Mitigation Measures for Construction Related Noise Impacts

The following mitigation measures would be implemented to minimize the construction-related noise:

- All construction vehicles or equipment, fixed or mobile, would be equipped with properly operating and maintained mufflers and acoustical shields or shrouds, in accordance with manufacturers' recommendations or best management practices; and
- Noise-generating construction activities associated with the project would comply with the following limitations on hours of operation: construction activities shall be limited to between the hours of 7 am and 10 pm from Monday through Friday, and between 9 am and 10 pm on Saturday and Sunday.
- Truck routes would be established that minimize noise impacts on residential and administrative areas.

D.3.3 Alternative D (No-Action Alternative)

Alternative D (No-Action Alternative) is the status quo. Test and evaluation flights would continue to be conducted as currently planned and approved on an individual basis. Potential noise impacts from these flights have been addressed in other environmental documents, and it has been determined that these operations would continue within established Air Force guidelines. There would be no unanticipated impacts on noise resulting from the No-Action Alternative.

E SOCIOECONOMICS

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E.1 SOCIOECONOMICS

The following excerpts from the *Global Hawk Beddown EA* were used as a reference in determining the data for adding addition personnel to Edwards AFB. The 918 military and civilian contractors for the Global Hawk is equivalent to 61 percent of the projected increase this proposed action; consequently, a factor was used to equate to the 1,500 personnel proposed.

2.0 EDWARDS AFB

Since the smallest economic region for which the RIMS II regional multipliers can be developed is the county, the affected environment for Edwards AFB for this RIMS II analysis includes Kern, Los Angeles, and San Bernardino counties in California.

2.1 Construction Impacts

Under this alternative, construction costs would be $16.5 million. Construction activities would employ an average of 16 workers at any one time. The indirect impacts of facility construction are shown in Table B-3.

Table B-3. Estimated Construction Impacts - Edwards AFB

Impact Based on the Change in Final Demand	
Change in Final Demand	16,500,000
Final-demand multipliers:	
Output (dollars)	2.1568
Earnings (dollars)	0.6083
Employment[a] (jobs)	19.8
Impact on:	
Output	35,587,200
Earnings	10,036,950
Employment (jobs)	327

[a] The employment multiplier is measured on the basis of a $1 million change in output delivered to final demand.
Source: U.S. Bureau of Economic Analysis 2000.

No changes to population would occur from construction activities. The required construction force of approximately 16 workers would be expected to be available from the local labor supply. Indirect jobs associated with construction expenditures would be approximately 327. Most indirect job growth would occur in the services, wholesale, and retail trade industries. This growth would represent less than 1 percent of current employment in the affected environment. No in-migration would be expected as a result of indirect job growth. Increased earnings as a result of construction activities would represent less than 1 percent of current personal income. Increased output would be $35.6 million. Construction activities would result in minor, short-term beneficial impacts to the local economy.

2.2 Operations Impacts

Under the proposed action, 119 officers, 753 enlisted, and 46 civilian and contractor personnel would be employed. Assuming average wage ranges for each group, salaries would total approximately $22.6 million (Defense Finance and Accounting Service 2000, U.S. Office of Personnel Management 2000). It is assumed that these personnel would in-migrate to the area for employment. Based on an average accompanying dependent factor of 1.8 (USAF 1997), direct population change as a result of operations would be approximately 2,570 (918 employees plus 1,652 dependents). This change would represent less than 1 percent of population in the affected environment. No impacts would be expected to population-affected resources such as housing and schools.

Annual operations and maintenance costs would be approximately $47.2 million. Indirect impacts associated with operations are shown in Table B-4.

Table B-4. Estimated Operations Impacts - Edwards AFB

		Final-Demand Multiplier			*Impact*		
Industry	*Regional Purchases (dollars)*	*Output (dollars)*	*Earnings (dollars)*	*Employment[a] (jobs)*	*Output (dollars)*	*Earnings (dollars)*	*Employment (jobs)*
Transportation	4,720,000	2.1332	0.5635	17.8	10,068,704	2,659,720	84
Utilities	4,720,000	1.801	0.3076	7.3	8,500,720	1,451,872	34
Wholesale Trade	14,160,000	1.8827	0.5256	15.2	26,659,032	7,442,496	215
Insurance	2,360,000	2.5266	0.7562	22	5,962,776	1,784,632	52
Business Services	16,520,000	2.0763	0.7118	22.1	34,300,476	11,758,936	365
Health Services	4,720,000	2.1447	0.7686	22.6	10,122,984	3,627,792	107
Households	22,600,000	1.3276	0.349	12.7	30,003,760	7,887,400	287
Sub total					125,618,452	36,612,848	1,144
Initial Change					47,200,000	22,600,000	918
Total					172,818,452	59,212,848	2,062

[a] The employment multiplier is measured on the basis of a $1 million change in output delivered to final demand.
Source: U.S. Bureau of Economic Analysis 2000.

Indirect jobs created as a result of operations would be 1,144. Most indirect job growth would occur in the services, wholesale, and retail trade industries. Indirect job growth would represent 1 percent of employment in the affected environment. The local labor pool would be expected to absorb this additional demand; no significant change in the unemployment rate and no in-migration of labor would be expected.

Operations would result in an increase of $125.6 million in output. Increased earnings as a result of operations would represent less than 1 percent of personal income. Global Hawk operations would result in minor beneficial impacts to the local economy.

REFERENCES

Defense Finance and Accounting Service. 2000. Monthly Basic Pay Table. Http://dfas.mil/money/milpay. 20 July 2000.

USAF. 1997. Draft Environmental Assessment for BRAC 95 Relocation of Units from McClellan Air Force Base to Beale Air Force Base. September.

U.S. Bureau of Economic Analysis. 2000. Regional Multipliers for Kern, Los Angeles, and San Bernardino Counties, CA; Nevada, Placer, Sutter, and Yuba Counties, CA; Clark, Greene, Miami, and Montgomery Counties, OH; Canadian, Cleveland, Logan, McClain, Oklahoma, and Pottawatomie Counties, OK; and Meade and Pennington Counties, SD. July. Washington, DC.

U.S. Bureau of Economic Analysis. 1997. Regional Multipliers, A User Handbook for the Regional Input-Output Modeling System (RIMS II). Third edition. March. Washington, DC.

U.S. Office of Personnel Management. 2000. Salary Table 2000 GS, Annual Rates by Grade and Step. Http://www.opm.gov/oca/2000tbls/Gsannual. 20 July.

F DISTRIBUTION LIST

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APPENDIX F—DISTRIBUTION LIST

DISTRIBUTION LIST

AFFTC Technical Library
412 TW/TSDL
Edwards AFB, CA 93524

Antelope Valley Air Quality Management District
43301 Division St., Ste. 206
Lancaster, CA 93639-4409
Attn: Charles L. Fryxell. APCO
(Or) Bret Banks, Operations Manager

Bureau of Land Management
Barstow Area Office
2601 Barstow Road
Barstow, CA 92311-3221

Bureau of Land Management
Ridgecrest Area Office
300 S. Richmond Road
Ridgecrest, CA 93555-4436

California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814

California Department of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296

City of Lancaster
Planning Department
44933 N. Fern Ave.
Lancaster, CA 93534

Congressman McKeon
Antelope Valley Field Office
1008 W. Avenue M-14 #E-1
Palmdale, CA 93551

Congressman Thomas
4100 Empire Dr.
Bakersfield, CA 93309

Edwards AFB Base Library
95 SPTG/SVMG
5 West Yeager Blvd.
Building 2665
Edwards AFB, CA 93524-1295

Federal Aviation Administration
Western Pacific Region
Attn: Charles Lieber
Airspace Management Branch
15000 Aviation Boulevard
Lawndale, CA 90261

Inyo County Free Library
Furnace Creek Branch
PO Box 568
Death Valley, CA 92328

Jerry Schwartz
Environnemental Lead
Surveillance Systems Engineering Group
FAA, AND-402
800 Independence Avenue SW, Room 511
Washington, DC 20591

John O'gara
Head of Environmental Planning
Environmental Office
Code 8G0000D
#1 Administration Circle
Naval Air Weapons Station
China Lake, CA 93555

Kern County APCD
Attn: Thomas Paxson, P.E.
2700 M Street, Suite 302
Bakersfield, CA 93301-2370

Kern County Department of Planning
and Development Services
2700 M Street, Suite 100
Bakersfield, CA 93301-2323

Kern County Library
Boron Branch
26967 20 Mule Team road
Boron, CA 93516

Kern County Library
California City Branch
9507 California City Boulevard
California City, CA 93505

Kern County Library
Mojave Branch
16916-1/2 Highway 14
Mojave, CA 93501

Kern County Library
Ridgecrest Branch
131 East Las Flores Ave
Ridgecrest, CA 93555

Kern County Library
Wanda Kirk Branch (Rosamond)
3611 Rosamond Boulevard
Rosamond, CA 93560

Kern River Valley Library
7054 Lake Isabella Boulevard
Lake Isabella, CA 93240
Attn: Karen Liefield, Branch Supervisor

Los Angeles County Library
Lancaster Branch
601 W. Lancaster Boulevard
Lancaster, CA 93534

Mojave Desert AQMD
14306 Park Ave.
Victorville, CA 92392-2310
Attn: Charles L. Fryxell, APCO

Muhammad Bari
Director of Public Works
HQ NTC Ft. Irwin
Attn: AFZJ-PW-EV
PO Box 105097
Building 285
Fort Irwin, CA 92310-5097

Native American Heritage Commission
915 Capital Mall, Room 364
Sacramento, CA 95814

Office of Historic Preservation
State Historic Preservation Officer
PO Box 942896
Sacramento, CA 94296-0001

Office of Planning and Research
California State Clearinghouse
PO Box 3044
Sacramento, CA 95812-3044

San Bernardino County
Land Use Services Department
Planning Division
385 N. Arrowhead Ave., 1st Floor
San Bernardino, CA 92415-0182

Sierra Club
Antelope Valley Group
P.O. Box 901875
Palmdale, CA 93590

Timbisha Shoshone Tribe
P.O. Box 206
Death Valley, CA 92328-0206
Attn: Pauline Esteves, Chairperson

USDA Forest Service
Pacific Southwest Region
Sequoia National Forest
900 West Grand Avenue
Porterville, CA 93257

U.S. Department of the Interior
National Park Service
Death Valley National Park
PO Box 579
Death Valley, CA 92328

U.S. Department of the Interior
Fish and Wildlife Service
Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726

U.S. Environmental Protection Agency
Region IX
EIS Review Section
75 Hawthorne Street
San Francisco, CA 94105

US Senator Barbara Boxer
501 I Street, Suite 7-600
Sacramento CA 95814

US Senator Diane Feinstein
United States Senate
331 Hart Senate Office Building
Washington, DC 20510

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G RESPONSE TO COMMENTS

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APPENDIX G

RESPONSE TO COMMENTS

The draft Routine and Recurring Small Transient and New Missions Environmental Assessment was distributed to public libraries and other potential stakeholders within the area of concern. A total of 4 public/agency comments were received, one request for a copy of the reference on emission factors for aerospace ground equipment used in the analysis, and 17 downloads of the EA and 11 downloads of the appendices as noted on the Edwards AFB BSX extranet (http://bsx.edwards.af.mil/environmental). A copy of each of the 4 public/agency comments, State Clearinghouse letter, and summary of the BSX website requests for downloads are attached. A response to comments table is also attached which addresses each public/agency comment.

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Response to Comments on Draft Routine and Recurring Small Transient and New Test Missions Environmental Assessment

Comment #	Commenter	Comment
1	Mr. Sheldon Toomer California City, CA	Gary, With 20% more aircraft flying at Mach 3 my house will probably have 20% more cracks to fill with all the sonic booms. Can't the pilots increase altitude at those speeds over housing neighborhoods. I just filled a lot of cracks. That's the only impact I have to report. Thanks, Sheldon D. Toomer

Response

Noted. Thank you for your timely response. The Federal Aviation Administration and U.S. Air Force have established specific areas around Edwards Air Force Base where aircraft can fly above the speed of sound at lower altitudes so they can train in conditions similar to what they might encounter when tasked to defend our nation. Not all sonic booms reach the ground or cause damage to property; however, California City is in close proximity to Edwards Air Force Base, so the potential for you to be affected is higher because one of the authorized high speed flight corridors overflies the southern portion of the base. The population density in these areas is generally extremely low, so as to minimize the potential for damage cause by sonic booms. The 95th Air Base Wing Public Affairs Office (95ABW/PA) at Edwards AFB collects information and responds to inquiries concerning possible damage that might have occurred on private property as a result of sonic booms or other military activities initiated from Edwards AFB. Please contact the Public Affairs Office by phone at (661) 277-3510 to discuss your specific concerns or by mail at:

Public Affairs
95 ABW/PA
1 S. Rosamond Blvd.
Edwards AFB, CA 93524

or via the Edwards AFB web site at www.edwards.af.mil.

Response to Comments on Draft Routine and Recurring Small Transient and New Test Missions Environmental Assessment

Comment #	Commenter	Comment
2	The Sanchez Family Barstow, CA	Dear Mr. Hatch, Hello, I live in Barstow, CA with my family. I've lived here al my life. But we have noticed all the aircraft and jets that fly over seem to trail-out smoke or clouds. It gets very thick and very, very sickening. We seem to have bad health. I used to be a runner almost all my life. Then I did notice the bad air as I ran, and how ill and dizzy I felt. My whole family feels sick too. We have so many uncomfortable symptoms: headaches, flu-like symptoms, allergies, burning eyes, nose-bleeds, rashes, bleeding, skin lesions, asthma, and much more. I recently got Bells Palsy, Fibromailgia and hypothyroidism. I think they are the results from this "Environmental Experiment" that you conduct everyday! Please let us know (the public) what is going on, and what we can do to STOP IT! We deserve the truth. Please help us clearly understand the situation. How long is this being conducted, and when will it end. Sincerely the Sanchez Family. (Jacquelyn)

Response

Noted. Thank you for your timely response. The airspace over Barstow is used by numerous commercial and private aircraft and the altitudes and associated emissions from these aircraft are beyond the control of this federal facility. Barstow, California is in the Mojave Desert Air Basin. Air emissions from military aircraft are authorized and emission levels are allowed in accordance with the California Air Resources Board, the State Implementation Plan, and local air district requirements. The following describes the air pollutants and their attainment status in the Mojave Desert Air Basin (MDAB) based on California Air Resources Board (CARB) Area Designations, Activities, and Maps. Table 1 summarizes the attainment status in the MDAB for these pollutants. A state or region is given the status of "attainment" or "unclassified" if ambient air quality standards (air below 3,000 feet) have not been exceeded. A status of "nonattainment" for particular criteria pollutants is assigned if the ambient air quality standard for that pollutant has been exceeded. Once designated nonattainment, the status of attainment may be achieved after three years of data showing non-exceedances of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a maintenance area, indicating the requirement to establish and enforce a plan to maintain attainment with the standard. The attainment status of Barstow is impacted because of its location in relation to Los Angeles, "bad air is blown over Barstow from LA".

The flights proposed by this Environmental Assessment would be below 3,000 feet when taking off, or when operating on authorized low-level routes. Air emissions for these flights were evaluated, and it was determined that the total emissions below 3,000 feet would be below minimum allowable levels and as such would not impact the current attainment status. Emissions (smoke and clouds) from flights above that altitude are spread by winds so the concentration would be below U.S. EPA acceptance standards; consequently, the probability is very low that the emissions from the military aircraft flying over Barstow are the cause of your medical condition.

Response to Comments on Draft Routine and Recurring Small Transient and New Test Missions Environmental Assessment

Response (Continued)

Table 1
Criteria Pollutants Attainment Status in the Mojave Desert Air Basin

Air Pollutants	State	Federal
Ozone (1-Hour)	Nonattainment - Moderate	Nonattainment
Ozone (8-Hour)	Nonattainment	Nonattainment
$PM_{2.5}$	Nonattainment/Unclassified	Nonattainment
PM_{10}	Nonattainment	Nonattainment
NOx	Attainment	Attainment
CO	Attainment	Attainment
Lead	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Comment #	Commenter	Comment
3	Sandy Hesnard Aviation Environmental Specialist Department of Transportation Sacramento, CA	Many airports are located within the R-2508 Complex area including the following public use airports: Independence, Lone Pine, Stovepipe Wells and Trona Airports in Inyo County and California City, Inyokern, Kern Valley, Mojave, Mountain Valley, Rosamond and Tehachapi Airports in Kern County. We recommend coordinating the proposal with the various airports to ensure the proposal will be compatible with future as well as existing airport operations. These comments reflect the areas of concern to the Division with respect to airport-related noise and safety impacts and regional airport land use planning issues. We advise you to contact our Caltrans District 8 and 9 offices concerning surface transportation issues.

Response

Noted. Thank you for your response. The potential impacts on the public use airports were evaluated and incorporated by reference as identified by numerous EAs identified in Appendix H. As part of the local Joint Policy and Planning Board and Complex Control Board, Edwards AFB maintains an open dialogue with these other airport managers to ensure safety and land planning issues are considered before any new programs are brought to Edwards AFB and the 412th Test Wing. Management of the Complex is the responsibility of the R-2508 Joint Policy and Planning Board (JPPB). JPPB members are the Commanders of the NAWC-WD, China Lake; AFFTC, Edwards AFB; and NTC, Fort Irwin. The mission of the JPPB is to enhance and preserve the R-2508 Complex bases, ranges, and special use airspace; and to increase DOD capability for

Response to Comments on Draft Routine and Recurring Small Transient and New Test Missions Environmental Assessment

Response (Continued)

research, development, testing, and evaluation of aircraft and weapons systems. Additionally, the JPPB preserves an area for operational training and readiness of DOD-sponsored activities. The R-2508 Complex Control Board (CCB) is comprised of representatives from each command. The R-2508 Complex Control Board conducts day-to-day management of the R-2508 Complex management function. Within the policy, scope, and limitations imposed by the CCB, the Central Coordinating Facility (CCF) has autonomous authority pertaining to R-2508 Complex shared use airspace utilization when the Complex is scheduled/activated for military use. The R-2508 Central Coordinating Facility, under direction of the Complex Control Board, is the designated scheduling authority for R-2508 Complex shared-use airspace. Consequently, any action affecting the airspace and airports below the R-2508 Complex are evaluated in detail and coordinated to determine if there would be any impacts prior to a commitment to increase to the number of operations.

Comment #	Commenter	Comment
4	Gayle J. Rosander IGR/CEQA Coordinator Department of Transportation District 9 Bishop, CA	The document does not address surface transportation impacts for the additional 1,500 military, government civilian contractor personnel (with families, the population would be even greater) to support increasing current operations by 20%. Such an increase would increase trips and may impact state and county roads. Please address the additional project rips generated by providing traffic analysis and mitigation, or explain why impacts are not significant and further analysis is not needed. Please see the following link to the Caltrans Guide for the preparation of the Traffic Impact Studies: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf. Please forward information pertinent to Caltrans.

Response

Thank you for your response. The surface transportation impacts were considered in light of the increase in population as compared to the level of operations that had previously occurred at Edwards AFB. A 20% increase in operations and 1,500 additional personnel is still less than what occurred in the early 1990s. The majority of the off-base personnel would live and commute from the Palmdale, Lancaster, Quartz Hill area that feed into State Highway 14. (Currently rated as Level B LOS). Dependents would use the local roads to go to school and work, but an increase of to the 589,043 [Wikipedia 2005] people living in the urbanized area by 2,700 would be less than a 0.4 % increase, a less than significant number. The road system in the urbanized area has improved since the 1990s. State Highway 14 was already a 4-lane superhighway. The main access to Edwards AFB has also improved since that era with Rosamond Boulevard increasing from a 2-lane to a 4-lane road and there have been improvements on Highways 58 and 395. Consequently, the increases that are larger than current operations, but less than those that occurred in the past and would not be considered significant based on historic knowledge of local traffic. In Section 3.1, 4.1 and Appendix A, we evaluated the air emission impacts of adding 1,500 personnel (approximately 375 military and 1,125 civilians). Based on historical data we assumed that not all of these 1,500 personnel would be commuting to the base every day. Review of Caltrans Transportation Concept Report for Hwy 14 (2004), Hwy 58 (2004), and 395 (2000) the LOS for the segments that feed into Edwards AFB that are within 25 miles of the base are all rated LOS C or better (most are rated Level B through 2030), and expected to be through 2015. We estimated (Table A-3) that 46% of the commuters would be from Kern County and 45% from Los Angeles County (probably 91% from the urbanized area of Lancaster/Palmdale) and 9% from San Bernardino County. Based on a vehicle occupancy of 1.2 persons per vehicle, then 385 additional vehicles would commute from Kern

Response to Comments on Draft Routine and Recurring Small Transient and New Test Missions Environmental Assessment

Response (Continued)

County, 376 from Los Angeles County, and 75 from San Bernardino County. Because there are 3 primary entrances to Edwards AFB (Hwy 14 to Rosamond Blvd for those coming north from Los Angeles and Antelope Valley [Lancaster/Palmdale])(Hwy 14 to Hwy 58 and Hwy 395 to Hwy 58 to the Boron Gate for those coming from the north, east, and west)(and Avenue E gate for those coming from the east [Hwy 395] and south via Palmdale) and not all commuters arrive at the same time, we estimate that 20% arrive by 7:00 AM, 60% by 8:00 AM and 20% by 9:00 AM and that 70% use the Rosamond gate, 20% use the Boron Gate, and 10% use the Avenue E gate. Consequently, we estimated that during peak hours an additional 351 vehicles would use the Hwy 14 corridor to the Rosamond Gate, 100 would use the Hwy 14/Hwy 395/Hwy 58 corridor, and 50 would use the Hwy 395/Avenue E corridor. Based on the Hwy 14 TCR a 2.5% increase in traffic would add 436 vehicles per hour to the 2001 baseline resulting in 20,316 AADT in 2011. Adding 351 additional vehicle trips would increase the total AADT projected for 2011 by 1.7% and the LOS would still be rated as Level B. For the segment of Hwy 58 between Mojave and the Boron Gate we estimate that 100 additional peak hour vehicle trips would result in less than a 7% increase above the projected 1,497 peak traffic load, but would still be less than 1% of the AADT projected for 2011. The LOS for this segment would still be rated as Level B. Adding 50 vehicle trips for the Avenue E corridor peak hours would increase the number of vehicles. Because Avenue E is remote desert environment, vehicles tend to travel at higher speeds similar to a multi-lane highway. Based on Caltrans guidance a traffic flow greater than 1,430 vehicles/hour/lane for a multi-lane highway would be required before the LOS transitions from Level C to LOS Level D, which would be considered significant. Since the current load during peak hours is less than 500 vehicles per hour, the addition of 50 more vehicles would not be expected to significantly affect the current LOS level. Based on this simple analysis, we conclude that there would be no significant impact on local roads and highways leading to or from Edwards AFB during peak or non-peak hours.

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Knight, Jim

From: Reinke, Danny C Civ USAF AFMC 95 ABW/EM [Danny.Reinke@edwards.af.mil]
Sent: Tuesday, March 18, 2008 1:01 PM
To: Knight, Jim; Mattson, Paul D CTR USAF AFMC 95 ABW/EM
Subject: FW: Air Craft

Importance: High

Small Mission Comment

-----Original Message-----
From: Hatch, Gary L Civ USAF AFMC 95 ABW/PAO
Sent: Tuesday, March 18, 2008 10:54 AM
To: Reinke, Danny C Civ USAF AFMC 95 ABW/EM; Mull, Thomas V CTR USAF AFMC 95 ABW/EM
Cc: Wood, Robert W Civ USAF AFMC 95 ABW/EM
Subject: FW: Air Craft
Importance: High

Danny, Tom,
This e-mail is from the lady in Barstow I talked to.
VR,
Gary

-----Original Message-----
From: jacquelynacat@msn.com [mailto:jacquelynacat@msn.com]
Sent: Monday, March 17, 2008 2:06 PM
To: Hatch, Gary L Civ USAF AFMC 95 ABW/PAO
Subject: Air Craft
Importance: High

Dear Mr. Hatch.

Hello, I live in Barstow Ca, with my family. I've lived here all my life.
But, we have noticed all the air-craft & jets that fly over seem to trail-out smoke or clouds. It gets very thick & very, very sickening. We seem to have bad health. I used to be a runner almost all my life. Then I did notice the bad air as I ran, & how ill and dizzy I felt. My whole family feels sick too.
We have so many uncomfortable symtoms; head-aches, flu-like symtoms, allergies, burning eyes, nose-bleeds, rashes, bleeding, skin lesions, asthma, & much more. I recently got Bells Palsy, Fibromialgia & Hypothyroidism.
I think they are results from this "Environmental Experiment" that you conduct everyday!

Please let us know (the public) what is going on, and what we can do to STOP IT! We deserve to know the truth.
Please help us to clearly understand the situation.
How long is this being conducted, and when will it end.

Sincerely the Sanchez Family.

ROUTINE AND RECURRING SMALL TRANSIENT AND NEW MISSIONS ENVIRONMENTAL ASSESSMENT
EDWARDS AIR FORCE BASE

MARCH 8, 2008

GARY, WITH 20% MORE AIRCRAFT FLYING AT MACH 3 MY HOUSE WILL PROBABLY HAVE 20% MORE CRACKS TO FILL WITH ALL THE SONIC BOOMS. CAN'T THE PILOTS INCREASE ALTITUDE AT THOSE SPEEDS OVER HOUSING NEIGHBORHOODS, IT JUST FILLED IN A LOT OF CRACKS. THATS THE ONLY IMPACT REPORT I HAVE.

THANKS,
Sheldon Towne

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-4959
FAX (916) 653-9531
TTY 711

clear 3-17-08 e

Flex your power! Be energy efficient!

March 13, 2008

Mr. Gary Hatch
U.S. Air Force Flight Test Center/95th ABW
5 East Popson Avenue, Building 2650A
Edwards Air Force Base, CA 93524-1130

Dear Mr. Hatch:

The U.S. Air Force, Edwards Air Force Base, Environmental Assessment for the Routine and Recurring Small Transient and New Test Missions; SCH# 2008021054

The California Department of Transportation (Caltrans), Division of Aeronautics (Division), reviewed the above-referenced document with respect to airport-related noise and safety impacts and regional aviation land use planning issues pursuant to the California Environmental Quality Act (CEQA). The Division has technical expertise in the areas of airport operations safety, noise and airport land use compatibility. We are a funding agency for airport projects, and we have permit authority for public-use and special-use airports and heliports.

The proposal is to add up to 15 aircraft, 2,000 sorties per year, and 1,500 military, government civilian, and contractor personnel to support small transient and new test missions that would operate at Edwards Air Force Base and in the R-2508 Complex.

Many airports are located within the R-2508 Complex area including the following public use airports: Independence, Lone Pine, Stovepipe Wells and Trona Airports in Inyo County and California City, Inyokern, Kern Valley, Mojave, Mountain Valley, Rosamond and Tehachapi Airports in Kern County. We recommend coordinating the proposal with the various airports to ensure that the proposal will be compatible with future as well as existing airport operations.

These comments reflect the areas of concern to the Division with respect to airport-related noise and safety impacts and regional airport land use planning issues. We advise you to contact our Caltrans District 8 and 9 offices concerning surface transportation issues.

Thank you for the opportunity to review and comment on this proposal. If you have any questions, please call me at (916) 654-5314.

Sincerely,

Original Signed by

SANDY HESNARD
Aviation Environmental Specialist

c: State Clearinghouse, Independence, Lone Pine, Stovepipe Wells, Trona, California City, Inyokern, Kern Valley, Mojave, Mountain Valley, Rosamond and Tehachapi Airports, Inyo County ALUC

DEPARTMENT OF TRANSPORTATION
District 9
500 South Main Street
Bishop, CA 93514
PHONE (760) 872-0785
FAX (760) 872-0754
TTY 711 (760) 872-0785

Flex your power!
Be energy efficient!

clear
3-17-08

March 12, 2008

Gary Hatch
95th Air Base Wing Environmental
5 East Popson Avenue, Building 2650A
Edwards Air Force Base, California 93524-1130

File: 09-FED
EA
SCH #: 2008021054

Dear Mr. Hatch:

Routine and Recurring Small Transient and New Missions Environmental Assessment (EA) Edwards Air Force Base

The California Department of Transportation (Caltrans) District 9 appreciates the opportunity to review the EA for increasing small transient missions and new test missions. We have the following comment:

- The document does not address surface transportation impacts for the additional 1500 military, government civilian and contractor personnel (with families, the population would be even greater) to support increasing current operations by 20%. Such an increase would increase trips and may impact State and county roads. Please address the additional project trips generated by providing traffic analysis and mitigation, or explain why impacts are not significant and further analysis is not needed. Please see the following link to the Caltrans Guide for the Preparation of Traffic Impact Studies:

  http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

  (There is a Rosamond-Willow Springs Traffic Impact Fee Program, which mitigates cumulative traffic impacts, but it would not be applicable to this military project.)

Please forward information pertinent to Caltrans. If you have any questions, I may be contacted at (760) 872-0785.

Sincerely,

Gayle J. Rosander

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: State Clearinghouse
Barry Nienke, Kern County Roads Department
Betty L. Miller, Caltrans HQ
Steve Wisniewski, Caltrans District 9

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

March 18, 2008

Gary Hatch
U.S. Air Force Test Center/95th ABW
5 E. Popson Avenue
Building 2650A
Edwards AFB, CA 93524-1130

Subject: Routine and Recurring Small Transient and New Missions Environmental Assessment at Edwards Air Force Base
SCH#: 2008021054

Dear Gary Hatch:

The State Clearinghouse submitted the above named Environmental Assessment to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 17, 2008, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

State Clearinghouse Data Base

SCH# 2008021054
Project Title Routine and Recurring Small Transient and New Missions Environmental Assessment at Edwards Air Force Base
Lead Agency U.S. Air Force

Type EA Environmental Assessment

Description The Air Force Flight Test Center at Edwards AFB, California proposes to add up to 25 aircraft, 2,000 sorties per year, and 1,500 military, government civilian, and contractor personnel to support small transient and new test missions that would operate at Edwards AFB and in the R-2508 Complex. Alternative A would include the complete contingent of aircraft, personnel, and major construction activities. The proposed action would result in a 20 percent increase over current operations at Edwards AFB and a 5.9 percent increase in use of the R-2508 Complex.

Lead Agency Contact

Name Gary Hatch
Agency U.S. Air Force Test Center/95th ABW
Phone (661) 277-1454 **Fax**
email
Address 5 E. Popson Avenue
Building 2650A
City Edwards AFB **State** CA **Zip** 93524-1130

Project Location

County Kern, Los Angeles, San Bernardino
City Lancaster
Region
Cross Streets
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways 58
Airports Edwards
Railways
Waterways
Schools
Land Use

Project Issues Air Quality; Cumulative Effects; Landuse; Noise; Other Issues; Public Services; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Vegetation; Water Supply; Wildlife

Reviewing Agencies Resources Agency; Department of Parks and Recreation; Native American Heritage Commission; Office of Historic Preservation; Cal Fire; Department of Fish and Game, Headquarters; Department of Water Resources; Department of Conservation; Caltrans, Division of Aeronautics; Air Resources Board, Airport Projects; Caltrans, Division of Transportation Planning; Department of Toxic Substances Control; State Water Resources Control Board, Division of Water Quality; Caltrans, District 9

Date Received 02/13/2008 **Start of Review** 02/13/2008 **End of Review** 03/17/2008

Note: Blanks in data fields result from insufficient information provided by lead agency.

Routine and Recurring Small Transient and New Missions Environmental Assessment

The United States Air Force is seeking public comment on an environmental assessment for a proposal to add up to 25 aircraft, 2,000 sorties per year, and 1,500 military, government civilian and contractor personnel to support small transient and new test missions that would operate at Edwards AFB and in the R-2508 Complex. This proposed action is in support of future Air Force research and development programs. Edwards AFB has historically been selected as a primary testing site for new aircraft and new systems because of its remote location and pristine conditions that support reliable flight. The open terrain, low population densities and minimal potential for impacts on the environment make this area ideally suited for the proposed action.

This Environmental Assessment evaluates the potential effects of the proposed action, including major and minor construction that could be needed to support the proposed action or alternatives.

Alternative A would include the complete contingent of aircraft, personnel, and major construction activities. The proposed action would result in a 20- percent increase over current operations at Edwards AFB and a 5.9-percent increase in use of the R-2508 Complex. These increased levels of activity would be significantly below activity that occurred in the 1980s and 1990s. Major construction would occur over a 3-year period, with the majority of the construction occurring during the first 2 years of the proposed action.

Alternative B would be similar to Alternative A, except only minor construction would occur.

Alternative C would use existing facilities.

Alternative D is the No-Action Alternative.

The document is part of the Environmental Impact Analysis Process which identifies potential environmental impacts on the physical, natural and human environment associated with the implementation of this proposal. The resulting analysis and documentation are intended to comply with the provisions of the *1969 National Environmental Policy Act* and implementing regulations.

Copies of the environmental assessment are available for public review on the Edwards AFB website (http://bsx.edwards.af.mil/environmental) and at the following libraries: Edwards AFB Base Library; Air Force Flight Test Center Technical Library; Kern County Libraries (Boron, California City, Mojave, Ridgecrest and Rosamond); Inyo County Free Library (Furnace Creek); Kern River Valley Library, and Los Angeles County Library (Lancaster). An electronic copy is available by request.

The deadline for public comments is March 17, 2008.

Mail comments to:

95th Air Base Wing Environmental Management
Attn: Gary Hatch
5 E. Popson Ave.
Edwards AFB CA 93524-8060

Comments may also be faxed to (661) 277-6145 or e-mailed to gary.hatch@edwards.af.mil. If you have questions, you may call Hatch at (661) 277-1454.

Please note: The advertisements that ran in local newspapers contained the wrong fax number. The correct number is (661) 277-6145.

Type	Name	Functions	Size	Modified
	Draft Environmental Assessment		905 KB	02/12/2008 03:03 PM
	Appendices		4192 KB	02/12/2008 03:02 PM

Audit Info for: **Draft Environmental Assessment**

Search Edwards Public Extranet for: Enterprise Go Advanced... Fri, 21 Mar 2008

Draft Environmental Assessment

General Specific **Audit** Categories References Versions

Event	Date ↓	User
Version Fetched	03/18/2008 11:07 PM	public
Version Fetched	03/18/2008 09:20 PM	public
Version Fetched	03/14/2008 04:46 AM	public
Version Fetched	03/14/2008 02:51 AM	public
Version Fetched	03/09/2008 10:29 AM	public
Version Fetched	03/09/2008 08:35 AM	public
Version Fetched	03/07/2008 12:51 PM	public
Version Fetched	03/04/2008 03:13 PM	public
Version Fetched	03/04/2008 02:13 PM	public
Version Fetched	03/04/2008 02:13 PM	public
Version Fetched	03/04/2008 01:31 PM	public
Version Fetched	02/20/2008 02:14 PM	public
Version Fetched	02/19/2008 10:39 AM	public
Version Fetched	02/15/2008 02:41 PM	public
Version Fetched	02/14/2008 01:27 PM	public
Version Fetched	02/14/2008 01:13 PM	public
Version Fetched	02/12/2008 03:09 PM	public
Attributes Changed	02/12/2008 03:03 PM	kumazawa patti
Rename	02/12/2008 03:03 PM	kumazawa patti
Version Added	02/12/2008 03:02 PM	kumazawa patti
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Appendices

General Specific **Audit** Categories References Versions

Event	Date ↓	User
Version Fetched	03/18/2008 11:07 PM	public
Version Fetched	03/18/2008 09:20 PM	public
Version Fetched	03/14/2008 04:46 AM	public
Version Fetched	03/14/2008 02:52 AM	public
Version Fetched	03/09/2008 10:29 AM	public
Version Fetched	03/09/2008 08:35 AM	public
Version Fetched	03/07/2008 12:58 PM	public
Version Fetched	03/04/2008 03:13 PM	public
Version Fetched	03/04/2008 01:32 PM	public
Version Fetched	02/15/2008 03:19 PM	public
Version Fetched	02/14/2008 01:21 PM	public
Version Fetched	02/12/2008 03:03 PM	kumazawa patti
Version Added	02/12/2008 03:02 PM	kumazawa patti
Create	02/12/2008 03:02 PM	kumazawa patti

H LIST OF NEPA DOCUMENTS

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H.1 LIST OF NEPA ANALYSES THAT APPLY TO THIS PROPOSED ACTION AND ALTERNATIVES

Environmental Baseline Study R-2508 Complex, 95th Air Base Wing and Air Force Flight Test Center, Environmental Management Office, Edwards Air Force Base, California 93524-1134. 2005.

Environmental Resource Document, National Aeronautics and Space Administration, Dryden Flight Research Center, Edwards Air Force Base, California 93523. June 2003.

Environmental Assessment for Armed Munitions Integration Testing on the Precision Impact Range Area. Air Force Flight Test Center, Environmental Management Office, Edwards Air Force Base, California 93524-1134. May 2005.

Environmental Assessment for the Continued Use of Restricted Area R-2515. Air Force Flight Test Center, Environmental Management Office, Edwards Air Force Base, California 93524-1134. 1998.

Environmental Assessment to Extend the Supersonic Speed Waiver for Continued Operations in the Black Mountain Supersonic Corridor and Alpha Corridor/Precision Impact Range Area. Air Force Flight Test Center, Environmental Management Office, Edwards Air Force Base, California 93524-1134. April 2001.

Environmental Assessment for Low-Level Flight Testing, Evaluation, and Training, Air Force Flight Test Center, Edwards AFB, California 93524-1134. May 2005.

Final Integrated Natural Resources Management Plan for Edwards Air Force Base, California, Edwards AFB Plan 32-7064, Edwards Air Force Base, California 93524-1134. 2004.

Environmental Impact Statement for Proposed Military Operational Increases and Implementation of Associated Comprehensive Land Use and Integrated Natural Resources Management Plans. Naval Air Weapons Station China Lake, California and The Bureau of Land Management, Ridgecrest, California 2003.

Environmental Assessment for Predator Force Structure Changes at Indian Springs Air Force Auxiliary Field, Nevada, U.S. Air Force, Air Combat Command. July 2003.

Environmental Assessment for Routine and Recurring Unmanned Aerial Vehicle Flight Operations at Edwards AFB, California, 95th Air Base Wing/Air Force Flight Test Center, December 2006.

Environmental Assessment the Repair, Reconstruction, and/or Replacement of the Main Base Runway, Edwards AFB, California, 95th Air Base Wing/Air Force Flight Test Center, September 2004.

Environmental Assessment for the Renovation and Construction of A Modern Flight Test Complex, Edwards AFB, California, Air Force Material Command /Air Force Flight Test Center, July 2003.

Environmental Assessment for the Construction of Phase II of the Dormitory Project at Edwards AFB, California, Air Force Material Command/Air Force Flight Test Center, December 2002.

Environmental Assessment for Routine and Recurring Unmanned Aerial Vehicle Flight Operations at Edwards AFB, California, 95th Air Base Wing/Air Force Flight Test Center, December 2006.

Programmatic Environmental Assessment for Small Building Construction, Relocation, and Modification at Edwards AFB, California, Air Force Material Command /Air Force Flight Test Center, December 1998.

Environmental Assessment for the Construction of the Information Technology Operations Center, Edwards AFB, California, Air Force Material Command/Air Force Flight Test Center, March 2001.

Environmental Assessment/F-22 Initial Operational Test and Evaluation. U.S. Air Force, Air Force Center for Environmental Excellence, San Antonio, Texas. September 2001.